GAS JOURNAL

LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

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PROPRIETORS: WALTER KING, LIMITED. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

Telephone: Central 6055. —— Telegrams: "GASKING, FLEET, LONDON."

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Editorial Notes.

The Industry's Work at Headquarters.

SPEAKING at the annual meeting of the National Gas Council of the improved industrial position which has developed since the coal stoppage of 1926, the President (Sir David Milne-Watson) said: "We are thankful for "the opportunity we have had of consolidating our posi-"tion after passing through a troubled period." The recovery that, with rapid strides, the gas industry made is indeed notable; and in the fact there is good reason for rejoicing over its vitality and capacity for quickly producing such a complete transformation from one state to another. But it did not do this without internal hard work. It is an excellent thing that we have a responsive demand from the public for what we have to offer as the result of our efforts; otherwise there would not be much encouragement to pursue so diligently the work for which the conduct, defence, and advance of the interests of the industry call. As the President's speech is read, we cannot fail to be struck by the fact that it is only by the industry's own initiative, exertions, and perseverance that this great public service is on the one hand encouraged by success, and, on the other, given (though with niggardly and slowly moving hand) greater power to do its best. It is strange beyond measure that between service and assistance to render it there should be so much space, while the opposite should be the case. Looking at the main components of Sir David's address, we see no one rushing forward, or seriously attempting to help onward, the legislation which the industry knows is necessary for its well-being in service. But we do see another industry trying to make it compulsory for it to be battened on the gas industry; we observe the Chancellor of the Exchequer, after hesitation (which implies a doubt), coming to the extraordinary decision that gas, electricity, and water should remain outside his rate-relief scheme for productive industry. In short, there is not a single constituent of the speech which does not show the imperative need for the industry being organized in a manner which enables the liveliest creative and defensive action from within, even to the rendering of assistance to our colleagues in Scotland in respect of a remarkable lapse of justice in the matter of electricity deficits, and to those in Ireland in connection with new and amending gas legislation.

The industry has always to be improving or consolidating its position. It has been attempting for a long time to contribute to its consolidation and improvement in powers through new gas legislation; and it is now long since that the memorandum on the subject was drafted and presented to the Board of Trade, and was published in our columns. But the anxiety of the industry to push forward with this revision and extension of powers does not seem to be shared by the Government, judging from their dilatory movement. The plans have been investigated by a Sub-Committee of the National Fuel and Power Committee, who have had before them a memorandum by the Board of Trade and evidence. There has also been a reference of the documents to associations representing local authorities. And the President tells us that no proposals have been made suggesting amendment of a serious character. That is good; but a year ago the President expressed the hope that the scheme for the amendment of legislation would be introduced to Parliament during the early part of the present session. Although in his forecast due allowance had been made for procrastination, he now thinks he was unduly optimistic. We do not agree. Such optimism which allowed for a lag was justified; it is those who are responsible for the extraordinary length of the lag who are at fault. Thus we must all feel with the President that the industry has just cause to complain on the ground that its claims have not yet been met. And now they are not likely to be during the term of the present Parliament, which will end in May or June next year—a fact which might be used, if pressure were applied, as the excuse for the further delay. Dealing promptly with this matter would have been a method of partial reward by the Government for what the industry did for the country in 1926.

Conjoined with this question of legislation is the investigation which has been made into the methods of charging for gas. The Central Executive Board are dealing with this matter in a thorough manner. The Committee who were appointed, under the chairmanship of Mr. C. F. Botley, to make research and report upon the subject, have presented a report which is solid testimony to their industry in assuring themselves on every point before making the recommendations. The report has been under the consideration of the District Executive Boards; and their comments and criticisms are being, or will be, examined and dealt with. Into the situation there has been introduced the decision of the Joint Committee of the two Houses of Parliament on the subject of the system of basic prices and dividends; and in view of this the whole question has been referred back by the Council to the Committee, who have been reinforced by the addition to their number of Mr. William Cash, F.C.A., and the President. But seeing that there are no signs of immediate movement in respect of the promotion of gas legislation by the Government, the further time that will be absorbed by exploring the need for any additional revision of the report will not be wasted.

There are many other matters which the Council have in hand in protecting and advancing the interests of the industry—such as the interdiction of gas in housing schemes by municipal authorities who have greater affection for their electricity undertakings than regard for the pockets and convenience of the tenants of their houses. The Council are getting together the necessary material for effectively dealing with this matter, and putting an end to the injustice and detrimental preference as soon as opportunity permits. In this case we have authorities curtailing the business scope of the industry; going beyond it, we have a sister industry proposing to curtail our manufacturing liberties. The remarkable plea has been made by the National Association of Coke and Bye-Product Plant Owners that the gas industry should be compelled to do business with them by taking from the coking plants their surplus gas. The proposed new gas legislation they consider is a suitable opportunity for pressing their claim to have statutorily made customers for their chief secon-

dary product. They preferred it before the Sub-Committee, and gave evidence to which the gas industry replied, with the only result that sane consideration could provide—the Sub-Committee regarded the matter as essentially one for discussion between the coke-oven owners and the National Gas Council. From the Council the coke-oven owners got the only possible answer. There is no ground for opposing contracts being entered into between gas undertakings and the owners of coking plants; but the Council would most strongly oppose the introduction of any plan savouring of coercion or compulsion. That reply was foreshadowed in references to the subject in the "Journal;" it is the only one the coke-oven people could have expected when face to face with the Council, with whom discussion is still proceeding. The gas industry in this country are not prepared lightly to sacrifice their manufacturing powers, and simply to become the purveyors of gas bought in bulk from a source over which they would have no control other than that of a customer. To gas men their statutory obligations are something real.

There is no surprise at the dissatisfaction felt by the Central Executive Board over the exclusion of gas with two other public utilities from the rate-relief scheme propounded by the Chancellor of the Exchequer when presenting his Budget to Parliament. Both the President and Mr. William Cash at the meeting made reference to this matter. There are many valid grounds upon which the case for the inclusion of gas in the scheme could be pressed; and we do not think the Chancellor can advance any substantial reason for refusing the request of the Council that he should receive a deputation on the subject. The terms in which Mr. Churchill himself made the announcement as to the exclusion of gas, electricity, and water undertakings indicate, as Mr. Cash points out, that there was indecision as to the right course to take; and it is also clear that, in coming to the conclusion to exclude, no sufficient inquiry had been made to supply justification for such action. There was no attempt to ascertain the views of the utility undertakings; but the opinions of other industries were sought. Furthermore, as the President says, the extinction for the gas industry of relief in respect of rates is only one aspect of the matter, inasmuch as any losses incurred by the scheme will fall upon Imperial taxation, and thus the gas industry would have to find money for enabling other people to obtain rate relief, which is a trifle Gilbertian when the other people happen to be the coke-oven people who are doing their best to relieve the gas industry of its coke markets. But it is not only redress that the Council, on behalf of the industry, would seek from the Chancellor; it wants a little explanation on several matters connected with indirect as well as direct rate relief.

These are only some of the more prominent topics that were treated upon at the annual meeting of the Council. In them there is no sign of the work of the Council growing less in importance or copiousness; and the industry cannot now do without such representation. The Council has the full trust of the industry; and that trust is enriched by the experience of every succeeding year.

Basic Price and Dividend System Reviewed, and Not Found Wanting.

There is one thing Government Departments have still to learn in connection with the control of trading undertakings. It is that, if the best is to be done for a business and for the customers generally, they must not expect to have every item of conduct and administration defined by cast-iron rules in accord with old bureaucratic beliefs and practices. Those beliefs and practices have to be renounced to-day in favour of saner principles; and never again must statutory control be allowed to deprive any trading concern—public utility or otherwise—of the freedom in doing business which brings to it the greatest success to the general advantage. It is in every case the ultimate effect, and not the effect of a single operation, which is the true test of the correctness of the conduct of a business. If the Board of Trade had had regard to this basic fact, and not to parliamentary precedent in wrong-doing, and had shifted their eyes from the price of gas to the ordinary consumer and allowed them to rest for a while upon other really vital considerations, we should not have had the Joint Committee investigation into the basic price and dividend system which has just been made in connection with the South Suburban and Dover Gas Companies' Bills. A little more vision would have shown that the ultimate effect of being in the position to offer inducements to big or industrial gas loads would inure, through the economies and efficiencies which such loads bring in their train, to the advantage of the ordinary and, in fact, every class of consumer, as well as to the proprietors and co-partners under a basic price and dividend system.

That the responsible department of the Board do not profess to possess the necessary vision to grasp the foregoing elementary facts of industrial and commercial life is shown by the narrow view which is found in their preliminary report on the subject of the basic price and dividend system. The doubts entertained by the Board as to the basic price system arose from (1) the consideration that the system of itself appeared to afford no protection to the small consumer as against the large consumer, because the price whereby the dividend payable was determined was not the price of gas to the ordinary consumer, but the arithmetic means of all prices; (2) the fact that the system as operated might offer inducements to undertakers to increase the price of gas rather than diminish it. Those statements alone are proof of an incapacity to see how, through the combined operations of a concern, the small or ordinary consumer is adequately and automatically protected by the final results; and from the incapacity comes the desire that everything shall be ruled by definition as exact as the yard measure or the pound weight. In their second report, the Board admit that, in their innocence, they have been scared by the idea that the bulk supply at a low price which the South Metropolitan Gas Company are going to furnish to the South Suburban Gas Company would be taken into account in determining the dividend of the former Company. But such an idea had not crossed anybody's mind other than that of the Board of Trade. Nevertheless, to satisfy any misgiving the latter might have, there was at once an expression of willingness to make the point a matter of definite disregard in determining the dividends to be paid. At the same time, there will be manufacturing economies and efficiencies issuing from the bulk supply arrangement; and the consumers generally will in the event be advantaged by them.

As our report of the proceedings before the Joint Committee has shown, the Board have, on more than one occasion, shown their aversion, for some singular reason, to the basic price and dividend system; and the result is that their efforts in opposition to it have established it in a stronger position than ever through the decision of the Joint Committee of both Houses of Parliament. In other words, the Joint Committee are in favour of commercial liberty under sufficient control such as the South Metropolitan Company introduced into their scheme (which has been endorsed eight or nine times by Parliament) rather than of bureaucratic rigour in the matter of statutory condition. This is in accord with the greater freedom which the Gas Regulation Act conferred on the gas industry. The Board of Trade will no doubt appreciate the significance of a decision which has been given against opposition to the system which came alone from them. The guardians of the public interests—the L.C.C. and the local authorities concerned in the South Suburban and Dover Bills—saw no grounds for objecting to the basic price and dividend system, which they judge, not on theoretical grounds, but on the practical experience by the South Metropolitan Company during the past seven years, supported by that of other concerns which have adopted it. Moreover, the ordinary consumers of the South Metropolitan Company and other companies working under the basic price and dividend system have not seen any cause to make protest against it. As a matter of fact, from our own observations, as being interested in the best interests of the gas industry, we have seen no evidence against, but everything in favour of, supporting the system from the points of view of the consumers of all classes, of the co-partners, and of all that not unimportant element in the success of every industrial enterprise—the investors.

We think it a pity the Board of Trade took up the attitude they did in this matter without first obtaining competent advice as to the actual effects of the system. That competent advice would have given ample assurance that, under the basic price and dividend system, and its incentives to the development of lines of business which would appreciate the conditions of a concern all round, together with the competition of electricity at low prices for purposes other than lighting, the ordinary and the small consumers have not only adequate protection, but something beyond which must be to their ultimate advantage.

The "S.B.G.I." and a Larger Life.

The members of the Society of British Gas Industries have decided that the time has arrived when they must enter upon a larger and fuller life, by taking a more pronounced part in the work of the gas industry, and by means which they claim the right to shape, but which will be fashioned with a desire to further the best interests of the industry. The resolve, which is a unanimous one, is the outcome of an investigation by a Committee into the past and present work of the Society, and the part it should take in the future. The fact that a Committee was appointed for this particular purpose shows that the members of the Society were discontented with their limitations—whether self-imposed or marked-out by circumstances—and that they desired to get beyond them into the open, and with the liberty of choice of action that attaches to adult life. We admire the resolve, because it means that the Society intends to strengthen what has proved to be a most valuable corporate body, and that, with stronger self-government and determination, it intends to devote itself still more effectively to the interests of the industry. This means that the industry as a whole will be in future the richer for what the Society is doing, and the partnership will be something of a more definite nature.

The claim of the Society to larger part and decision in the work of the industry has every justification from whatever point of view it is surveyed. The organization has never refused its co-operation in any work designed to advance the interests of the industry; and the whole objective of the present report (which we published last week) is to increase that co-operation, but under a more rigid autonomy. And to that the members are entitled. Co-operation with the Society means co-operation with men who have done perhaps more than any other section of the industry to promote its technical and commercial interests. Look at the lines of the progress that has been effected, and which has meant much to the material interests of gas undertakings—lines leading from carbonization and material handling, through purification, storage, distribution, to utilization. The greater part of the advances has been realized through the research, ingenuity in design, and ability to supply the lessons of research by individual firms who constitute the main membership of the Society. The facts are so patent and striking that to refuse them recognition would be the height of folly. Nevertheless, the least boastful regarding these doings are the men who have accomplished them; but the achievements cannot escape recognition to-day as having been largely contributory to the success and development of the industry. It is not claimed that what has been done has been entirely devoid of selfish motive—the selfish motive of seeking to live. The firms who have done so much are alive to the need in their own interests to keep abreast of times and requirement, and to create new methods and new efficiencies; and the greater their success, the more important their service to the industry. And the greater the success of the industry through their endeavours, the better for their own fortunes. The mutuality is plain. Thus it is that there is a genuine desire, with complete justification, for larger part, voice, and action in the work of the industry; and the Society is taking the initiative in securing it.

No secret is made of the view in the report and in the speech of Dr. E. W. Smith (reported last week) that the representation of the Society in the counsels of the industry has hitherto been of a somewhat nebulous kind; but in future it is desired that it shall be appreciated that the representatives of the Society on Committees and so forth are what they are intended to be—the mouthpieces of the Society and the transmitters of the co-operative policy, and not of the firms with which the representatives happen to be identified. The Society desires to speak and vote as an organized body, and as such to shoulder larger responsibilities; and so to get out from the backwaters in which some people, without vision and without appreciation of solid facts, put the members, while their legitimate place is in the main stream with the rest. To carry out their scheme, the Council of the Society want two things—(1) Ideas; (2) the necessary finances for a fund to support the proposals which it may be decided to put forward for joint action. The ideas will no doubt flow freely in an organization where such a combination of technical and commercial talent is found; and as to the formation of an ample fund, the recommendation was unanimously adopted. The Council of the Society feel that, if the proposals are carried out, the future usefulness and prestige of the Society will be considerably enhanced. We are certain on that score—in fact, we believe that now the Society has made this resolve, we are at the beginning of important developments. Up to the present, there has not been a single thing that the Society has taken in hand that has failed. Having been in close touch with it from its birth, and knowing its constituent members, we are sure that there will not be failure now to bring to effective state a fine aspiration and intention.

Industry and Applied Science.

A chastened man should be found in Lord Balfour to-day. He ventured to assert recently that while this country had excelled in pure science, it has been somewhat laggard in applying science to industry and practical purposes. That was more than the Society of Chemical Industry could stand; and so a conference was convened, at which friendly rebuke was administered to his Lordship—in, of course, quite an impersonal fashion, by showing that he was distinctly in the wrong. History proves it, and so do the developments of the times. Chief among those who at the conference illustrated how science has been applied to industry was Sir Alfred Mond; and his address on the subject is of a remarkably convincing order. It is difficult to deny hard living facts; and, if Lord Balfour replies, he will have to climb down a long way, and admit that his indictment of industry in respect of its scientific shortcomings requires a lot of qualification—in other words, that there was only partial truth in what he said. For example, in the gas industry, and this no doubt applies to other industries, there are a number of undertakings—large, medium sized, and small—that apply science to their operations; there are others that still work by rule-of-thumb or the hoary directions of the text-book. But because of this it must not and cannot be said that the gas industry does not apply science to its practical purposes.

Of course, Lord Balfour's suggestion was that other countries are in advance of us in the application of science to practical purposes. This is a matter which cannot be judged by mere contemporary movement. No country has a monopoly of science; but every country has its scientists, inventors, and discoverers. And the honours of discovery may be with one country at one moment, and with another the next; and the same with practical application. We have heard a great deal about what happened when Perkin discovered mauve, and the Germans developed the aniline dye industry. Sir Alfred Mond rather thinks Lord Balfour, when he made the remark to which exception is taken, had had his mind influenced by those facts; but Sir Alfred gently admonishes those people who think the beginning and the end of the chemical industry are found in aniline dyes. And much of what he had to say in his address proved how largely chemistry enters into most industries, and how considerably it has been responsible for the developments of industries of all kinds. Many industries would not be here to-day had it not been for chemical discovery and application, and something else—the spirit of enterprise or adventure in the financial world. And in this respect Sir Alfred must be counted a leader; for while he is an industrial financier, he has the

acumen which comes from training and knowledge for making a fair assessment of the probable value of an invention to the world, and the likelihood of its commercial success. But in that respect he has an individuality, which, curiously perhaps, indicates where Lord Balfour might have had good ground for complaining of this country's backwardness. The backwardness is not so much on the part of the British manufacturer's willingness to apply the discoveries of science, as reluctance on the part of British capitalists to embark money on what are ventures, which, if successful, offer great reward, but if failures mean total loss. The spirit of industrial enterprise and speculation is not a great trait of our British financiers; they want to see the security. And yet research, experiment, and development must all be financed, and that is where Sir Alfred finds the Germans are much more enterprising than are many in this country. They work on a scale in the attempt to discover new ideas which would make some chairmen of companies here shudder with horror, and make finance directors tremble. And yet it is all essential to progress. It is not by any means a question of not having men in this country of ingenuity and scientific ability, and men who are prepared to apply science to actual manufacture. They want the opportunity, the same as research workers and inventors—like Haber with his synthetic nitrogen, and Bergius with his hydrogenation of coal. "In both these instances, the "work was brought to a certain stage of perfection by "men not in touch with any organization, and it is pos-"sible that neither would have succeeded in bringing "their inventions to the commercial stage unless their "ideas had been taken up by the technical staff of big "enterprises, and developed from a brilliant thought into "a practical reality."

This all leads up to the point in relation to industrial progress of the importance of commanding industrial units which bring scope, intellectual and equipment facilities, and finance to bear. Sir Alfred Mond is satisfied that there is an enormous field for brains and enterprise in investigating and carrying out the development of ideas and solving problems. And there is room for a large amount of organization and reorganization in these directions. For one thing his big Company are trying to break down the border line between research workers and works management. That is an excellent idea. The best cannot be done for and in any works in which the research worker and the works manager operate each in his own water-tight compartment. To attain the best results, there must be intermingling. The research man must understand works problems; and the works management must understand the difficulties of the research worker. That is fruit of experience which should have greater application. Sir Alfred Mond interests us immensely with his ideas regarding the future. It was, for instance, a wonderful piece of statesmanship which planted in his Company a Council of Research, who are assisted by a number of leading scientists in this country, with the object of pointing out what are likely to be the future developments of science. To be forewarned is to be forearmed; to have possible developments indicated to industrial and financial magnates is to set them on the track of possibilities and, if worth pursuing, of eventual materialization. Sir Alfred is also looking to great things from catalysis, which has become the handmaiden of many industries; and, combined with high temperatures and high pressures, it invokes the skill and ability of the chemist, the engineer, and the physicist. Then there is the development of the application of nitrogen to the soil. That is a big and essential quest, for, with the large developments of production of synthetic nitrogen, we want absorption, and the provision of cheap and plentiful supplies of food is a need. There is no question that at the present time the chemical industry is more far-reaching, extensive, and interesting than it has ever been; and there is greater and greater realization of the national and industrial responsibility that attaches to it. However, all that is said here and in Sir Alfred Mond's address points to the fact that in this country we are not behind others in the application of science to industry. But we may not be so far advanced as some of them in industrial adventure on the large scale; and thus it is that, by comparison, we may appear to be behind them, though not actually so.

Sulphate Investigation—A Question of Funds.

In our "Correspondence" columns to-day, there is a letter by Mr. W. W. Townsend, of Colchester, which draws attention to the question of sulphur and ammonia recovery on gas-works, to the need for investigation, and to the funds required for the purpose. The question of cheapening sulphate of ammonia production has already been referred by the Central Board of the National Gas Council to the Effluents Committee of The Institution of Gas Engineers for information and report; but the suggestion of our correspondent is that what is required is something which goes beyond the mere question of cheaper sulphate production by the old process. He urges, following up an editorial in the "Journal" for Mry 9, that reconsideration should be given to the process of direct ammonia recovery in the light of present knowledge, and to Dr. Hans Bahr's catalytic process by which he claims the ability to recover both sulphur and ammonia from gas at a cost representing only about 60 p.ct. of that of the old methods. As Mr. Townsend points out, the industry has to face the fact that ammonia and sulphur must be removed from gas, and there are objections to our present methods. There is the effluent difficulty, the high cost of the sulphuric acid, and the capital cost and space occupied by the oxide purifiers. It is evident that something has to be done in connection with sulphate manufacture, and while doing it, if we can effect other improvement, then let it be done. It is also obvious that the necessary investigation cannot be made without money. The funds allotted to the Institution for research work would not provide for the extensive exploration which would be required to make quest for a successful process such as Mr. Townsend has in view. But this is recognized as an exigent matter throughout the gas industry; and therefore there is no doubt that Mr. Townsend is right when he says that the "Money for this purpose would be readily forthcoming, as the discovery of a successful process would be of obvious financial advantage to all gas undertakings." The hint may be taken up in the proper quarter. If it is, and we can do anything to help to bring it to a successful issue, there will be pleasure in doing so.

Preliminary to Our Institution Number.

In our next issue we shall publish much of special interest to those who intend to visit Cardiff for the Annual Meeting of The Institution of Gas Engineers. In the first place, there will be the detailed programme and the Council's Report. Then we have been favoured by Mr. J. H. Canning with an article descriptive of the beautiful countryside which will be traversed on June 15; and Mr. Walter Dunn is contributing an account, illustrated by photographs, of places of interest in Cardiff. Finally, we have arranged, with the willing help of Mr. Octavius Thomas, to give portraits of the many ladies and gentlemen who have formed the Reception Committee, and upon whose unselfish efforts so much depends.

Road Openings by Public Utility Concerns.

The members of the House of Lords have been engaged in considering a motion by Lord Montagu of Beaulieu which was intended to express the opinion of the House that the time has come when the whole question of the rights of undertakers to dig up public roads for water, drains, gas, electricity, and similar services, and to use such wayleaves free of charge, should be reconsidered. His Lordship has been hammering away at this matter for the past three years, and so have the County Councils Associations; but nothing has resulted, and we do not see why it should. Public utility undertakings operate under statutory powers; and when they originally laid pipes; the structures of roads were not as they are to-day. The change has been brought about not by the undertakings using the subsoil, but by the traffic on the surface. But his Lordship, Earl Russell, and maybe others, are of opinion that it is the users of the subsoil who should pay more towards the maintenance of the roadways. They already pay heavily in rates; and it costs them much more now for the maintenance and renewal of their distribution systems, which, like the surface of the roadway, perform a public service. That in-

creased cost for maintenance and renewal (which the consumers of the conveyed commodity have to pay) is due to the heavy and expensive work involved in making openings in the roads that are founded on concrete or reinforced concrete beds for the service of modern traffic. Through this the costs of serving the public have been increased. Lord Montagu's motion was by leave withdrawn; but apparently there is a feeling that there should be an inquiry into the matter. Instead of talking of additional contributions from gas, electricity, and water for road maintenance, the Road Fund should contribute something towards the additional expenses these undertakings are put to by the constructional features of roads demanded by modern traffic.

Injuring the Coal-Export Trade.

In the first month of the operation of the Five Counties Coal-Marketing Scheme, no great quantity of coal was exported under it; but with the increase of the quota, exporters have had more latitude. Coal is now being shipped to Scandinavia at very low prices; and the coal owners and exporters in Northumberland are becoming much perturbed. The Five Counties bounty scheme on exports, it is said, is making a difference in some cases of as much as 4s. per ton in price; and it is feared that this will spell ruin for some exporting areas. The money which enables this to be done is, of course, provided by coal buyers at home. One disturbed colliery owner is stated to have said: "The regular exporting districts, having practically overcome the worst of the foreign competition, are now betrayed by this callous scheme, which is of a nature unheard of in this country, and is destined to injure the nation's export trade by unfair and uneconomic conditions."

Industries and the Coal-Selling Schemes.

If the Midlands coal-marketing scheme is to be a success, higher prices must be paid, and these the Association are asking—1s. to 2s. per ton extra being the rates on expiry contracts. But industries show no disposition to pay the higher prices; and they have stiffened their backs through (so a Manchester paper says) the settlement of gas coal contracts at last year's quotations in some instances, and 1s. per ton less in others. They see in this a tendency towards values of about the same level as last time, in spite of the coal owners declared policy. The industries find good reason now to use coal with the greatest economy and efficiency; and they are doing it more and more, with the result that their orders are not so bulky as was formerly the case. Steel makers and engineering firms especially are buying smaller tonnages, and, as far as possible, are patronizing the collieries outside the Association.

PERSONAL.

PRESENTATION TO MR. A. W. BROOKES.

To commemorate the completion of fifty years' service by Mr. A. W. BROOKES, the Secretary of the British Gas Light Company, Ltd., the Chairman and Directors entertained the Chief Office Officials and the Engineers of the several stations of the Company to luncheon at the Savoy Hotel on May 22. The toast of "Our Guest," which was proposed by the Chairman (Mr. Henry Woodall), who was ably supported by the Deputy-Chairman (Mr. Harold G. Palmer) and Mr. Thomas Glover (the Senior Engineer of the Company), was received with acclamation; and after Mr. Brookes had replied, the Chairman, on behalf of the Company, presented him with a handsome silver-gilt porringer, and a cheque for a substantial sum "in grateful recognition of fifty years' good and faithful service." Mr. Brookes was the recipient also of a silver rose bowl from the Officials of the Chief Office "as a small token of their esteem and regard." In returning thanks for these gifts, Mr. Brookes referred to a present which he had received from the Managers of the Trowbridge, Holywell, and Bradford-on-Avon Stations, and said that he was shortly visiting Hull and Norwich to receive presentations from the Officials of those stations.

Officials and members of the staff of the Cardiff Gas Light and Coke Company gathered in full force at the offices in Bute Terrace last Thursday evening for the purpose of making a presentation to Mr. JAMES BOXHALL JAMES, Superintendent at the Company's head office, who has recently been appointed Assistant Secretary and Sales Manager of the Preston Gas Company. The meeting was presided over by Mr. R. J. Auckland, F.C.I.S. (Secretary); and the presentation, which took the form of a gold wrist watch suitably inscribed, was made by Mr. H. D. Madden (Chief Engineer). References were made to the fact that Mr. James has been associated with the Company for over 24 years; to the high esteem in which he is held; to his meritorious military service during the great war; and to the great interest he has always displayed in amateur sport—football in particular.

OBITUARY.

The death took place suddenly, on May 17, of Mr. J. HASTINGS, Secretary and Director of the Falkirk Iron Company, Ltd., and an outstanding figure in Scottish iron founding circles. A native of Beith, he first went to Falkirk about 25 years ago, and took up employment with Messrs. R. & A. Main, Ltd., Gothic Iron Works, and later entered the services of the Falkirk Iron Company as cashier. When the Company was formed into a limited Company, he was appointed Secretary and a Director of the firm. Mr. Hastings was keenly interested in politics, and had been for a number of years the Chairman of the Falkirk Burgh Liberal Association.

GAS SESSION AT THE CIVIL ENGINEERS' CELEBRATION.

Mention has already been made in the "JOURNAL" of the fact that, in connection with the celebration of the centenary of incorporation by Royal Charter of the Institution of Civil Engineers, there is to be an engineering conference. One of the sessions is to be devoted to subjects in which our readers are specially interested; and the matter is returned to now with the object of urging all gas engineers who are able to do so to attend the session, full particulars of which are set out below. It will be noticed that the session is divided into two parts, and that the second part is reserved for consideration of a subject in which keen interest is being taken at the present time. This is "Waterless Gasholders," and it will be introduced by Mr. Frank Prentice, who can speak from actual experience of the first holder of the kind to be put into operation in this country. A fine gathering of gas engineers for this portion of the proceedings at any rate should be assured.

A programme of visits to works includes the Fuel Research Station, East Greenwich, and the Wandsworth Works of the Wandsworth, Wimbledon, and Epsom District Gas Company.

Tuesday Morning, June 5.

10.30–11.45	.. Library of the Institution ..		Subject: "Utilization of Solid and Liquid Fuels." Introduced by Dr. C. H. Lander.
			Subject: "Coke Oven, Town, and Producer Gas." Introduced by Mr. Robert Ray.
			Chairman: Sir Richard Threlfall, G.B.E., F.R.S.
			Vice-Chairmen; Mr. James Swinburne, F.R.S., and Prof. W. A. Bone, F.R.S.
			Hon. Secretaries: Messrs. H. R. J. Burstall and H. P. Gaze.
11.45–1.0	.. Do. ..		Subject: "Waterless Gasholders." Introduced by Mr. Frank Prentice.
			Chairman: Dr. Charles C. Carpenter, C.B.E.
			Vice-Chairmen: Messrs. Thomas Hardie and W. R. Herring.
			Hon. Secretaries: Messrs. G. Evetts and H. C. Head.

Second International Conference on Bituminous Coal.

Between sixty and seventy scientists and fuel technologists in eleven different countries, it is announced, have tentatively accepted invitations either to speak or to read papers at the Second International Conference on Bituminous Coal, which will be held at the Carnegie Institute of Technology in Pittsburg during November next. The purpose of the congress is similar to that of the one held in 1926 by the Carnegie Institute of Technology—to present the results of recent studies of coal that have to do with improved methods of utilization and combustion. Tentative acceptances have been received from (among others) the following scientists, who will either be present or will contribute papers at the congress: Prof. William A. Bone, Imperial College of Science and Technology; Dr. Cecil H. Lander, Director of Fuel Research, Department of Scientific and Industrial Research; Dr. R. Lessing, Consulting Engineer; Sir Alfred Mond; Mr. Harald Nielsen, Sensible Heat Distillation, Ltd.; Dr. E. W. Smith, Technical Director, Woodall-Duckham Companies; and Mr. F. S. Sinnatt, Assistant Director of Fuel Research, Department of Scientific and Industrial Research.

NATIONAL GAS COUNCIL.

Meeting of Central Executive Board.

A Meeting of the Central Executive Board of the National Gas Council was held at the Hotel Cecil, W.C. 1, on May 22, prior to the Annual General Meeting—Sir David Milne-Watson in the chair.

Nomination for the Office of President.

It was unanimously decided to nominate Sir David Milne-Watson as President of the Council for the ensuing year.

Membership of the Board.

It was reported that Mr. W. J. Sandeman had been appointed by the London District Executive Board to take the place of Mr. A. Caddick, and that The Institution of Gas Engineers had nominated Mr. C. S. Shapley in place of Mr. J. W. McLusky (Glasgow), while the British Commercial Gas Association had nominated Mr. A. Procter (Chairman of the York Gas Company), their President, in place of Sir Russell Bencraft (Southampton).

Bridges Bill.

It was reported that a Memorandum had been sent by the Conjoint Conference of Public Utility Associations to the Minister of Transport, pointing out that adequate accommodation should be provided for sub-surface works of public utility undertakers in bridges when reconstructed, and that the cost of removing any main, necessitated by reason of the powers in the Bill, should be borne by the highway authority. The Minister of Transport, it was stated, had received a small deputation from the Conference on April 30, when the Minister stated that he would be prepared to insert a clause protecting the *existing* rights of public utility undertakers, but refused to consider the question of accommodation for mains and cables in such bridges. He stated, however, that he would confer with the highway authorities in the matter.

Budget Proposals.

It was reported that, following upon a meeting of the Emergency Committee of the Central Executive Board summoned on April 30 to consider the exclusion of the gas industry from the rate-relief which the Chancellor of the Exchequer proposes to grant to other productive industries, communications had been sent both to the Chancellor and to the Minister of Health, protesting against this unfair exclusion.

Gas Legislation—Irish Free State.

The main proposals contained in this Bill were outlined, as well as the steps taken by the Council to safeguard the interests of their Irish member undertakings.

Ammoniacal Liquor—Railway Rates.

It was decided to appoint a small Committee to prepare the case for a reduction of the high rates charged by the railway companies for the carriage of ammoniacal liquor.

Report of the Committee on Gas Charges.

In view of the decision of a Joint Committee of both Houses of Parliament in favour of the retention and extension of the basic price and basic dividend principle, this report was referred back to the Committee on Gas Charges for their observations as to the extent to which that decision affected the conclusions set out in their report.

Electrolysis.

It was reported that the attention of the Council had been called to a number of cases in which damage had been caused to gas pipes owing to the leakage of electrical current upon consumers' premises. This was due sometimes to defective workmanship, sometimes to failure to maintain the wiring in a sound condition, and sometimes to faulty earthing. It was decided to investigate further the legal and technical considerations involved in apportioning the responsibility for such damage.

Trustee Act.

It was reported that the Conjoint Conference of Public Utility Associations were taking up with the Treasury the question of certain gas stocks being regarded as trustee securities, and that further considerations had arisen which made it desirable for the matter to be discussed by a small Committee of the Council. The matter was therefore remitted to a Committee which was meeting the following day.

ELECTRICITY SUPPLY MEMORANDA.

Apparently the prescription of the Government for providing a reliable and cheap supply of electricity for the country is not suitable for their own purposes. They or the Admiralty believe in having their own private power plants—just the same as the Government talk of electric heating for Hodge's cottage, and then pack the cellars of the Government offices full of coal. A Borough Electrical Engineer, writing to the "Electrical Review," states that he has been informed that the Admiralty is, or has recently been, installing new generating plant at the Portsmouth and Devonport Dockyards. Of course, as a matter of policy—particularly in times of war—it may be that it would be better for the Admiralty to possess their own generating plants than to rely on others over which they have no direct control. This point has not struck a "Borough Electrical Engineer." He views the matter from the quite reasonable standpoint that, with "selected" stations at Portsmouth, Southampton, and Plymouth, it is most illogical that a Government Department should be extending its small power stations in proximity to them. He assumes that the Government anticipate that the supply from the Central Electricity Board's mains will not be sufficiently cheap or reliable for Admiralty purposes. As a matter of fact, "Borough Electrical Engineer" has not met a single electricity supply engineer who thinks the Government scheme will result in a supply of electricity that is reliable or cheap to the consumer. If he did expect to meet any, then he must have been a much deceived optimist.

The Admiralty's Choice.

Mr. D. G. W. Acworth, of the General Electric Company, Ltd., in an address to the London and Home Counties Ironmongers' Association, spoke of the developments of electrical cooking appliances. He mentioned that the chief development noticeable in recent years has been in connection with hotplates. If that has been the "chief" one, then the electric cooker has been standing still. It has been more of an endeavour than a development. The efforts of manufacturers have been directed to meeting the demand for a plate sufficiently robust to give long life with low maintenance charges, and yet sufficiently quick in operation to meet the public requirements for an electric appliance comparable with the gas ring. The difficulty of meeting this demand is that, whereas in the gas ring the gas can be consumed at a rate only limited by the number of jets and the pressure of the gas, in the electric hotplate both the length of the resistance wire and the working temperature of the wire put the limit to the total loading of a plate of any given size. The result is that in the electric hotplate the heat output can never exceed 55 to 60 p.ct. of the equivalent heat output of the gas ring of the same diameter.

The Equivalent.

There are some people in the electricity industry who are getting worried—unnecessarily so we think. One of them signs himself "Anxious" at the foot of a letter addressed to the "Electrical Times." He heads the communication "Effect of the Cooking Load on the Mains." The "effect" has so far been very modest. But he asks, "What is going to happen if a great boom comes along?" We suggest that, after the struggles of the electric cooker during the past quarter of a century or more, there is no immediate cause for anxiety. However, he rightly says that, supposing there was a boom, great consideration would have to be given to the revenue earning capacity of the load. It would mean the laying of larger mains and services for the demand. There would therefore be heavier capital charges to meet; and it is doubtful whether in its present form the load would pay its way. We ask our electrical friends to consider the fact that the peak load of many gas undertakings is on Sunday morning; and it is all pressed into the space of about two hours while Sunday cooking is going on. Just consider what that means in terms of heat units. However, "Anxious" is really perturbed. He sees that, if the demand became general in all avenues, it would only require a few cookers, to say nothing of water heaters, in each street, with a load of anything from 3 to 7·5 kw. each, to necessitate a general relaying of the distribution network. He is confident that, if the cooking load matures, it will be rather a serious problem. We think so too; but at present "Anxious" may rest contentedly on the "if." Its seating accommodation in this instance is really greater than appears on the surface. "Meteor's" comment on this is: "Now is the time to make ready for the possibility; and to shape our systems and methods in such a way that the deluge may be welcomed and withstood, instead of taking us by surprise." "Meteor" is one of those armchair advisers who make light of heavy capital outlay

The Cooking Load and the Mains.

that has to be set against a revenue of ¾d., 1d., or 1¼d. per unit. Other people who are responsible have to think more seriously.

Northumberland Clause.

In the annual report of the Central Executive Board of the National Gas Council, satisfaction is expressed at the success of the Council's efforts in inducing the Electricity Commissioners to insert a form of the Northumberland Clause in original Electricity Orders. The provisions of the Northumberland and similar clauses are well known. They have been in existence and application for a great many years, solely with the view of ensuring that municipal electricity supply undertakings so order their charges and revenue that income is capable of satisfying outgoings without having recourse to the rates. When there was such recourse, it meant that gas undertakings had to help to subsidize their competitor. What has been done is to get recognition of a somewhat similar clause in Special Orders, although there has been great difficulty in realizing this, and much time has been spent over the matter. The clause which the Commissioners have agreed to insert in original Electricity Orders provides that periodical reviews shall be made of the accounts of the undertaking, and that any loss shall be made good by increasing the price of the commodity, and not by subsidies from the rates. Negotiation is proceeding respecting the insertion of a similar clause in Extension Orders.

The Wandering Cat.

Early on the morning of last Saturday week, an inquisitive cat wandered on to the controls and caused an explosion at the sub-station of the North Metropolitan Electric Power Station in Church Lane, Tottenham. The cat will wander no more. She did mischief enough on this one occasion. A short circuit was caused; the engineer-in-charge (Mr. Edward Carey) was burnt about the face and arms; and there was a collapse of the supply. This was restored to normal in about two hours.

Power from the Wash.

The Sheffield Correspondent of the "Times Trade and Engineering Supplement" calls attention to a proposal by the Dynamic Electrical Company for the establishment of a hydro-electric power plant at the Wash, in Lincolnshire. According to the scheme the Wash area of about 158 square miles would be divided into a full basin of 100 square miles and an empty basin of 58 square miles. Two dams would be built—a sea dam with inflow sluice gates to allow the high tide to flow into the basin at or near high-tide level and with locks to permit the passage of shipping, and a dividing dam to separate the full from the empty basin. Upon the dividing dam the power station would be erected, so that the water would fall 15 ft. through turbines from the higher to the lower level. The sea dam between the high level and the sea would have outflow sluice gates, through which the waste water from the power station would return to the sea at low-water level, thus providing a continuous supply of power at full and at low tide levels. The sea dam would be about 12¾ miles long, and the dividing dam about 13 miles. It is claimed that there are no engineering difficulties, and it is estimated that the total cost of the scheme would not exceed £7,000,000.

Mishaps.

A four-storey factory belonging to Messrs. W. H. Pownall, Ltd., manufacturers of overalls and women's clothing at Longsight, Manchester, was destroyed by fire last Wednesday afternoon. The "Manchester Guardian" says the fire started in the cutting-room on the first floor; and, it is assumed, was due to the fusing of an electric wire. Another account says the fire is believed to have originated through a spark from an electric cutting-machine. The Manchester Fire Brigade were engaged on a road fire at Didsbury on the 20th inst. An electric cable under the footpath fused, and set fire to the insulating material. The gas which was generated exploded, flagstones were lifted, and flames rose between them.

"B.C.G.A." DISTRICT CONFERENCE AT TRURO.

A District Conference of the British Commercial Gas Association, the first of its kind to take place in Cornwall, was held at Truro on May 24. A large gathering assembled in the handsomely equipped Truro City Council Chamber. Mr. S. J. Ingram, Managing Director of the Truro Gas Company, and President of the Cornish Association of Gas Managers, presided, and was supported by the Mayor of Truro (Mr. R. K. Worth), and Messrs. W. E. Hicks (Chairman of the Truro Chamber of Commerce), P. S. Hoyte (Engineer and Manager of the Plymouth and Stonehouse Gas Light and Coke Company), F. G. Kingwell (Secretary of the Falmouth Gas Company and Secretary of the Cornish Association of Gas Managers), J. H. Ellis (Chairman of the Plymouth and Stonehouse Gas Light and Coke Company), George E. Withers, F.R.I.B.A. (London), W. M. Mason (Manager of the British Commercial Gas Association), L. P. Ingram (Manager of Truro Gas Company), and Dr. J. G. M. Molony (Medical Officer of Health, Truro).

Welcome to Delegates.

The Mayor of Truro extended a cordial welcome to the delegates. He felt certain they were there to do good to the industry they represented, and to do good also to the community they served. The Chairman of the Truro Chamber of Commerce joined with him in the welcome to that city. Their President (Mr. S. J. Ingram) was an enthusiast and an optimist; and any industry was fortunate in having such a man as one of their leaders. Truro was proud of Mr. Ingram not only for his association with the gas industry, but for his many activities in the public life of the city. [Applause.]

Mr. S. J. Ingram thanked the Mayor for allowing them to meet in such congenial surroundings, and they appreciated his kind words of welcome. This was the first time a district conference of the kind had been held in Cornwall, and from the large attendance they could see that the idea was greatly appreciated. The "B.C.G.A." took a high and lofty view of their duties in connection with the industry. They were out for service in order to make this country better and happier.

The Influence of Environment on Home-Making.

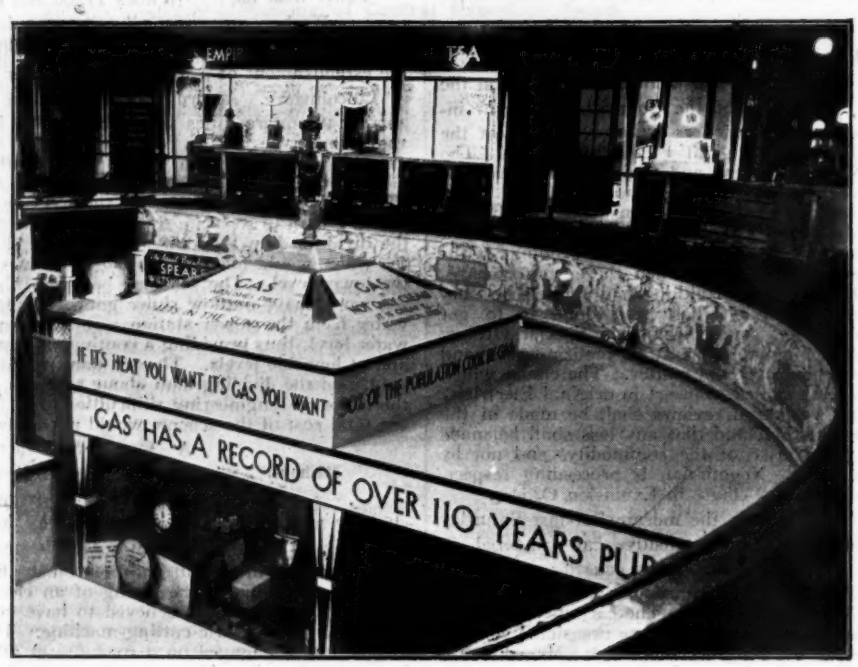
Mr. S. J. Ingram then introduced for discussion the subject of "The Influence of Environment on Home-Making." He thought he was safe in asserting that in no country in the world was the beauty and sanctity of home life more keenly appreciated and practised than in this country. In so many Continental countries particularly, the home was simply a place to sleep in, and in which to partake of the morning meal. Then the various members of the family dispersed to obtain their other meals and recreation elsewhere. It would be readily understood how the formation of habits of this nature led to a serious weakening of moral restraints. As lovers of this country, they were naturally anxious that their standard of home life should not be lowered. He stressed the ethical side of home-making because he was profoundly convinced that the future of this country depended to a very great extent on its people being happy and contented, and that could only be ensured by providing them with healthy and convenient homes. They could not expect to raise any but a C3 race in the sordid slums of the great cities, where God's sun never entered. Let sunlight into their homes, and they would have a healthy and contented people. Environment counted; and it was their duty as citizens to provide such homes for their boys and girls that they would grow up with healthy bodies and minds.

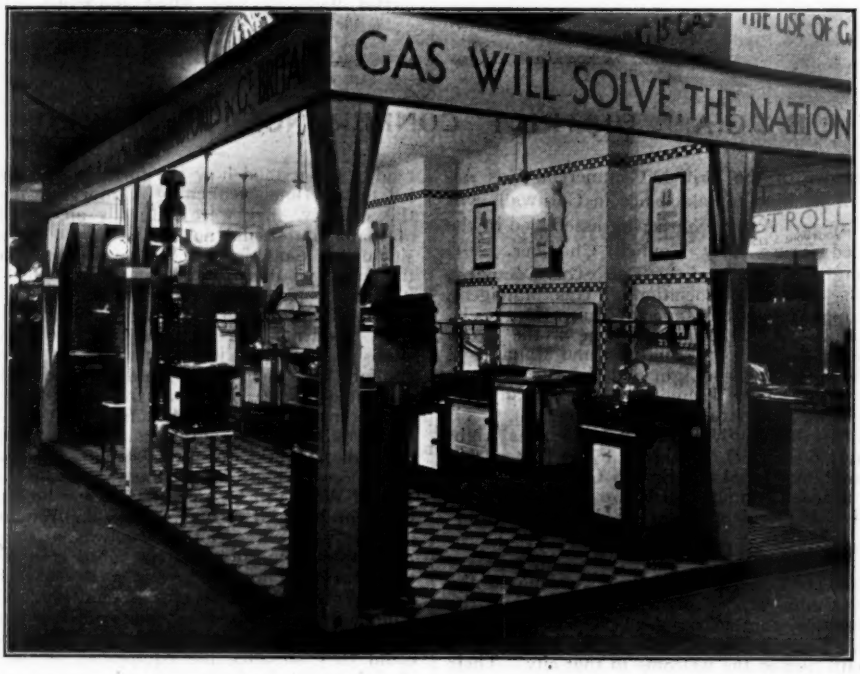
There had been no more striking change in their national life in recent years than what was known as the "Emancipation of Women," for good or ill—and he anticipated that most of them believed it was for good. Woman was taking her rightful place in society. She was no longer the chattel of man, the drudge of the home. She claimed, and was entitled to, the recreation and pleasures attached to her position. That naturally had an important bearing on their home life. The wife and mother was not content to submit to the work or drudgery usually associated with domestic life. How, then, could they so alter the equipment of the home that, while abolishing the drudgery of it, they would still retain that which had made their home life so beautiful and attractive? He was glad to believe that that conference would show that the industry they served had made this possible.

"I am proud to know how largely gas has assisted the industries of this country," continued Mr. Ingram. "There are over 2000 industrial processes in which gas plays an important part. During the war it made a tremendous contribution, by the provision of high explosives and other munitions of war, to ensuring victory to the Allied cause. I am proud to remember it, but I have much greater satisfaction in knowing that in over nine million homes in this country, gas, by its service of light and heat, conserves the health and happiness of our people, and helps to make the home life of this country what it has ever been—the envy and admiration of other nations of the world. But we have not yet reached perfection. Slums, unhappily, still exist. Home-making is still going on; but the great service which gas can render in the home is unfortunately not too well known. I am therefore not without hope that as a direct result of this conference such information will be gained as will enable us to make our homes still more healthy and beautiful and attractive."

[A report of the further proceedings at the conference is held over for later publication.]

BRISTOL IDEAL HOMES EXHIBITION.





The accompanying two photographs, sent by Mr. S. E. Halliwell, the Secretary and Commercial Manager of the Bristol Gas Company, show the Company's exhibit at the Bristol Ideal Homes Exhibition, held from April 12 to April 25. It was a new venture, organized by a Bristol firm; and the attendance was exceedingly satisfactory.

On April 21 the exhibition was opened for the children from the City Schools. Many thousands visited the show, and the Company had special demonstrations carried out for their information.

It was a valuable means of propaganda, and was much appreciated.

Berthelot Souvenirs.

A circular from the Société de Chimie Industrielle, whose headquarters are at 49, Rue des Mathurins, Paris, gives particulars of a series of souvenirs of the great chemist Marcelin Berthelot. The centenary of Berthelot's birth was celebrated in Paris last year at the Sorbonne and the Panthéon, when more than 1800 scientists from all quarters of the globe united in paying homage to his memory. The occasion was further commemorated by the decision to found a "Chemistry House" in Paris; and subscriptions for this were invited and received from individuals and organizations in France and abroad. It is intended that the "Maison de la Chimie shall constitute a real home in which the chemists of all countries will be assured of a worthy reception, and that it shall become a new and powerful factor in the intellectual intercourse of nations." The subscription lists are still open; and now the Berthelot Committee are offering souvenirs, as stated above, the profit on the sale of which will go towards the fund. There will be a portrait engraving of Berthelot, signed or unsigned by the artist (100 fr. and 50 fr. respectively); a bust (in bronze, 7500 fr.; plaster 625 fr.); a medal (100 fr.); and a souvenir volume of more than 400 pag s in three bindings (500, 550, and 600 fr. respectively). Applications for any of these should reach the Société de Chimie Industrielle before June 30.

NATIONAL GAS COUNCIL OF GREAT BRITAIN AND IRELAND.

TENTH ANNUAL GENERAL MEETING.

A record of good work accomplished was submitted by Sir DAVID MILNE-WATSON, LL.D., D.L. (the President), to the large attendance of members at the Tenth Annual General Meeting of the National Gas Council, which was held on Tuesday afternoon of last week, at the Hotel Cecil, Strand, W.C.

At the opening of the proceedings, the minutes of the ninth annual general meeting, which had been circulated, were taken as read, confirmed, and signed.

MEMBERS OF THE CENTRAL EXECUTIVE BOARD REPRESENTING DISTRICT EXECUTIVE BOARDS AND ASSOCIATED BODIES.

The SECRETARY (Mr. W. J. Smith) reported the following list of members of the Central Executive Board appointed and nominated respectively by the District Executive Boards and Associated Bodies:

Eastern District.—Messrs. Thos. Glover, C.B.E., M.Inst.C.E. (Norwich), W. H. Mainwaring (Lincoln), R. G. Shadbolt (Grantham), and W. W. Townsend (Colchester).

Irish District.—Messrs. R. Bruce Anderson, A.M.Inst.C.E. (Waterford, &c.), W. J. Grey, A.C.A. (Alliance and Dublin Consumers' Gas Co.), Joseph McNicholl (Cork), and J. D. Smith, M.Inst.C.E., J.P. (Belfast).

London District.—Messrs. F. J. Bradfield, F.C.I.S. (Commercial), Thomas Hardie, M.Inst.C.E. (Gas Light and Coke), F. H. Jones, M.Inst.C.E. (Wandsworth), and W. J. Sandeman (Croydon).

Manchester District.—Messrs. G. S. Frith (Runcorn), J. H. Sillitoe, A.C.I.S. (Manchester), W. J. Smith, B.Sc. (Bolton), and Samuel Tagg, M.Inst.C.E., J.P. (Preston).

Midland District.—Messrs. Leslie E. Clift (Redditch), Harold Davies (Chesterfield), P. N. Langford (Coventry), and A. W. Smith (Birmingham).

Northern District.—Messrs. Herbert Lees, A.M.Inst.C.E., J.P. (Hexham), T. P. Ridley, F.C.I.S. (Newcastle-on-Tyne), F. P. Tarratt (Newcastle-on-Tyne), and Norman S. Cox (Sunderland).

Scottish District.—Messrs. George Braidwood (Coatbridge), Lawrence Hislop, F.C.S., F.R.S.S.A. (Cowdenbeath), George Keillor (Greenock), J. W. Napier (Alloa), and W. E. Whyte, O.B.E., *additional member (not more than four representatives to attend meetings of Board), see C.E.B. Minutes,* 12/10/26 (Lanark District of the Middle Ward).

Southern District.—Messrs. C. F. Botley, M.Inst.C.E. (Hastings), Wm. Cash, F.C.A., J.P. (Bournemouth), H. C. Head, M.Inst.C.E., M.I.Mech.E., M.I.Chem.E. (Winchester), and A. Valon, M.Inst.C.E. (Westgate).

South Wales District.—Messrs. Wm. Clark Jackson, A.M.I.Mech.E. (Neath), W. H. Johns, M.I.Mech.E. (Swansea), J. E. Kenshole (Merthyr Tydfil), and H. D. Madden, M.Inst.C.E., M.I.Mech.E. (Cardiff).

South-Western District.—Messrs. J. H. Ellis (Plymouth and Stonehouse), S. E. Halliwell (Bristol), S. J. Ingram (Truro), and W. N. Westlake (Exeter).

Yorkshire (W.R.) District.—Messrs. Harold E. Bloor, B.Sc., B.Eng. (York), A. E. Mottram (Ossett), E. H. Hudson (Normanton), and C. S. Shapley (Leeds).

Representing the British Commercial Gas Association.—Mr. R. Halkett, Alderman F. S. Phillips, J.P., Mr. A. Procter, and Sir David Milne-Watson, LL.D., D.L.

Representing the Institution of Gas Engineers.—Messrs. H. D. Madden, M.Inst.C.E., M.I.Mech.E., C. S. Shapley, John Terrace, M.Inst.C.E., and John Wilkinson, O.B.E.

Representing the Gas Companies' Protection Association.—Messrs. R. J. Auckland, F.C.I.S., R. W. Edwards, D. H. Helps, A.M.Inst.C.E., and Wm. Phillips.

ANNUAL REPORT, 1927-28.

The annual report, which was next submitted, was in the following terms:

GAS REGULATION ACT, 1920.

Progress has been slow during the year in adopting the thermal basis of charge, only two applications for Orders having been made, and only one Order having been granted.

At the present time there are in England, Wales, and Scotland approximately 200 statutory undertakings which have not yet adopted the therm basis of charge. Although these 200 undertakings represent approximately 26 p.ct. of the total number of authorized undertakings, they account for not more than 15 p.ct. of the total quantity of gas sold.

During the period under review, 51 Orders have been granted under Section 10 of the Act—which corresponds closely with the number of Orders made during the preceding year.

GAS LEGISLATION.

(*a*) *Council's Proposals.*—A memorandum embodying the Council's proposals for new gas legislation, which was submitted to the Board of Trade last year, was referred by the Board of Trade to the National Fuel and Power Committee, appointed in accordance with the recommendations of the Royal Commission on the Coal Industry.

As stated in the last annual report, the National Fuel and Power Committee heard evidence from Mr. Thos. Hardie on behalf of the National Gas Council, and from Prof. Cobb on behalf of The Institution of Gas Engineers, on March 3, 1927, regarding the place of the gas industry in the scheme of national fuel economy.

Mr. Ogilvie and Mr. Hardie gave evidence before the National Fuel and Power Committee on July 14, 1927, in support of the Council's proposals for new gas legislation. The National Fuel and Power Committee thereafter appointed a Sub-Committee to whom the Board of Trade supplied a copy of the Council's proposals and a memorandum by the Board of Trade in regard thereto. These documents were sent by the Sub-Committee to various bodies, including associations representing local authorities, with a request for their observations. It would appear that the objections made by such associations to the Council's proposals are not serious in character.

(*b*) *Coke Oven Gas.*—The National Association of Coke and Bye-Product Plant Owners, having learnt that the gas industry were desirous that the Government should introduce further gas legislation, made application to the Sub-Committee of the National Fuel and Power Committee to give evidence on the matter. The Association submitted to the Sub-Committee a statement, including, *inter alia,* a proposal that gas undertakings should be obliged to take surplus coke oven gas at prices to be mutually agreed, or, failing agreement, at a price to be determined by an arbitral tribunal.

Representatives of the Coke Oven Association appeared before the Sub-Committee in support of their statement on Jan. 19, 1928. Mr. Ogilvie and Mr. Hardie were present at this hearing, and strongly contested the proposals put forward. The Sub-Committee expressed the view that the question raised was suitable for discussion between the coke oven owners and the Council. One meeting has already taken place, and further meetings will be arranged for discussion of this question.

The Council have made it clear to the coke oven owners that, while they are in no way opposed to contracts being entered into between gas undertakings and coke ovens, they would most strenuously oppose the introduction of any proposal savouring of coercion or compulsion.

METHODS OF CHARGING FOR GAS.

As a result of the interim report dated July 9, 1926, presented by the Committee appointed by the Council to consider the question of differential prices for gas, the Committee were requested by the Central Executive Board to pursue their inquiries into methods of charge other than the present flat-rate system.

The Committee has now presented its final report, which, upon the instructions of the Central Executive Board, has been circulated among all members of the Council. Each District has been asked to convene a meeting for the purpose of receiving the comments and criticisms of members. It is expected that the Central Executive Board will have received before the end of May the views of the District Executive Boards in regard to the report.

Meanwhile, it is desired that the report shall be considered as strictly private and confidential; and a communication to this effect has been sent to all members of the Council.

ELECTRICITY ORDERS—"NORTHUMBERLAND" CLAUSE.

It is satisfactory to report the success that has at last attended the Council's efforts to induce the Electricity Commissioners to insert a form of the well-known "Northumberland" clause in original Electricity Special Orders.

The object of this clause is, in the case of Special Orders promoted by municipally-owned electricity supply undertakings, to prevent the electricity undertaking having recourse to the rates. The Electric Lighting Acts empower local authorities who are authorized distributors of electricity to make good any deficiency which may occur by subsidizing their undertaking from the local rates. This places the gas company in the unenviable position of having, as a ratepayer, to bolster up its chief competitors, who may be selling electricity at a wholly uneconomic rate.

The clause which the Electricity Commissioners have now, upon the Council's representations, agreed to insert in original Electricity Orders provides that periodical reviews shall be made of the accounts of the undertaking, and that any loss shall be made good by increasing the price of the commodity, and not by subsidies from the rates.

The Council are still in negotiation with the Electricity Commissioners with regard to the insertion of a similar form of clause in "Extension" Orders.

ELECTRICITY (SUPPLY) ACT, 1927—IRISH FREE STATE.

Reference was made in the last annual report of the Council to the steps being taken by them with a view to safeguarding the interests of Irish gas undertakings in connection with the above Bill.

Most of the amendments submitted by the Council were adopted, including a clause on the lines of the "Northumberland" clause, requiring the Electricity Supply Board from time to time to revise the rates of charge for electricity so as to ensure that the receipts from electricity should cover the expenditure incurred in connection with the supply whether under the Act or otherwise.

The Council are now engaged in assisting their Irish undertaking

members in connection with a Government Bill which is to be promoted in the Dail for the amendment of the Gas Regulation Act in Ireland.

Municipal Housing Schemes—Restriction upon the Use of Gas.

The Council have on several occasions given advice to undertakings which have suffered from attempts on the part of local authorities either to prohibit the use of gas entirely in municipal houses or to restrict its use to certain purposes. The advice given by the Council has on more than one occasion met with success; but abuse of their powers on the part of local authorities by taking advantage of their position as landlords to force tenants to take current from their own electricity supply undertaking is becoming so common that the Council have now decided that the matter is one involving an important question of general principle.

The Council have determined at the first available opportunity to take the necessary steps in Parliament to rectify the position.

Rating.

Reference was made in the last annual report to a projected policy of the Council whereby the interests of gas undertakings would be safeguarded in questions of revaluation under the provisions of the Rating and Valuation Act, 1925. In accordance with this policy, a Reference Committee has been set up in each district, to which undertakings can refer questions relating to their assessment. In addition, an eminent firm of rating surveyors has been engaged to advise the Council on questions of principle.

The opinion of Counsel has been taken on two or three occasions with regard to matters of peculiar interest to the industry as a whole; and the gist of such opinions has been given in the Council's monthly reports. Among the questions thus dealt with was the extent to which gas engines and electric motors, respectively, situated on industrial premises, could be assessed for rating purposes.

The Council have also supported two small undertakings in Scotland in their appeals before the Judges in the Valuation Appeal Court with regard to points of principle affecting the assessment of gas undertakings in Scotland. The Council are also supporting the appeal of an Irish undertaking in connection with the interpretation of section 7 of the Annual Revision of Rateable Property (Ireland) Amendment Act, 1860.

The Council have also co-operated with the Conjoint Conference of Public Utility Associations for which Mr. Ogilvie (Joint Manager) acts as Joint Honorary Secretary, on many rating matters which affect public utility undertakers as a whole, and this joint action has on many occasions proved eminently useful. Among matters dealt with by them may be mentioned the question as to how far rating authorities are entitled to receive the information asked for in notices issued by them under section 40 of the Rating and Valuation Act, 1925, and the refusal of an Inspector of Taxes to allow as a working expense the fee paid by a gas undertaking to a rating expert employed in connection with an appeal against a rating assessment.

Railway Rates.

The Council have carefully followed the proceedings of the Railway Rates Tribunal, with a view to safeguarding the interests of the gas industry; and when the railway companies last July submitted certain amendments and alterations which they proposed to ask the Tribunal to sanction to the classification of merchandise and the schedules of standard charges already approved by the Tribunal, the Council lodged objections to the proposal. The suggested alteration would have taken coke out of the existing "coal, coke, and patent fuel" class; and it would have been open to the railway companies to apply to the Railway Rates Tribunal for increased standard charges for the carriage of coke.

As a preliminary, however, to hearing the objections a meeting was arranged between the railway companies and representatives of the National Gas Council and the National Federation of Iron and Steel Manufacturers, as a result of which the railway companies agreed to withdraw their suggested amendment, and the Council were not, therefore, under the necessity of proceeding with the objection they had lodged with the Tribunal.

The Council were also successful in obtaining a concession from the railway companies in connection with the carriage of gas fires, cookers, &c., under owners' risk conditions. Many undertakings have sought advice and assistance with regard to the continuation of exceptional rates, terminal services, private siding agreements, and other kindred matters.

Road Tar.

The constitution of the British Road Tar Association was ratified last July; and the new Managing Council lost no time in carrying on the work so successfully initiated by the Joint Tar Committee, representing gas undertakings, coke oven owners, and tar distillers. District Tar Boards have been formed, so that the whole country may be covered by the organization. Experimental road sections have been laid with British tar, and are justifying the claims of the Association that tar as a road-making material is unsurpassed.

The Association has had attractive publicity centres at all available exhibitions throughout the country, including Blackpool, Birmingham, Harrogate, and London. An improved specification for tar for road purposes has now been agreed upon by the Managing Council.

World Power Conference.

The Technical Committee completed in July last their programme for the Fuel Conference which is to be held in London from Sept. 24 to Oct. 6, 1928. This programme was circulated to the member countries of the World Power Conference, the Press, and organizations and individuals likely to be interested.

Advantage was taken of a meeting of the International Executive Council of the World Power Conference at Cernobbio in September last to discuss the technical programme with the representatives of other countries present. It is evident that it has been most favourably received, and that the Fuel Conference has already aroused widespread international interest. Promises of over 100 papers have already been received, dealing with practically every division of the programme; and it appears probable that the total number of papers presented will be about 170.

It is anticipated that 1500 delegates will attend. British contributions to the section dealing with carbonization are being prepared under the auspices of the Joint Committee of The Institution of Gas Engineers, the Coke Oven Managers' Association, the Fuel Section of the Society of Chemical Industry, and the Institute of Fuel. The Imperial Institute has been placed at the disposal of the Conference. It is hoped that among the various visits which will be arranged for delegates attending the conference will be one to a modern, well-equipped gas-works.

District Executive Boards.

The Council have once more to express their indebtedness to the District Management Committees, Chairmen, and Secretaries for their assistance during the year under review. So many matters of great importance to the gas industry have from time to time to be referred to the districts for consideration and information that, without the co-operation which is always forthcoming from the districts, the work at headquarters would be much increased.

Co-operation.

The Council have continued to co-operate with other Associations and bodies in connection with questions of common interest. The work of the Conjoint Conference of Public Utility Associations (representing gas, water, electricity, tramways, and light railways) has largely increased. The negotiations between the Conjoint Conference and the highway authorities in regard to the question of mains and cables in highways have not, unfortunately, as yet been brought to a successful issue; but the conference has been successful in obtaining an amendment to last year's Finance Bill, whereby public utility companies are exempted from payment of stamp and transfer duties in cases of reconstruction and amalgamation. Representations have also been made to the Treasury for the purpose of obtaining a like concession in the case of amalgamations where municipal undertakings are involved. A deputation waited upon the Financial Secretary to the Treasury; and the conference is awaiting the outcome.

Numerous other questions have been dealt with by the Conjoint Conference, including those relating to the rights and duties of public utility undertakers *vis-à-vis* railway companies and highway authorities, points on rating law, &c.

General.

The Council have continued to watch the passage of any Bills through Parliament which might affect the interests of the gas industry, and have given advice and assistance in connection with Private Bills, applications for Special Orders, and innumerable points of law on matters affecting particular undertakings. These matters include questions arising out of the Public Health (Smoke Abatement) Act, 1926, by-laws relating to the ventilation of bathrooms and geysers, building by-laws, difficulties in the disposal of effluent from sulphate of ammonia plant, railway rates, alterations to mains and sub-surface work due to road widenings, &c., claims for compensation from railway companies, public lighting contracts, borrowing powers, income-tax questions, &c.

Finance.

Income.—The total amount received by way of joint subscriptions to the National Gas Council, the British Commercial Gas Association, and The Institution of Gas Engineers during the financial year under review amounted to £69,623, of which sum £18,893 is available for the purposes of the National Gas Council. Of this amount, £1836 represents subscriptions paid in advance, and has, therefore, been carried forward to the financial years 1928-29. An amount of £1895, representing subscriptions paid in advance, has to be brought forward from the last account, 1926-27. The total subscriptions to the National Gas Council in respect of the year ended March 31, 1928, amounted, therefore, to £18,952. To the above figure of £18,952 must be added interest on deposit account (£124) and payments made by manufacturers of "Standard" cookers (£32), making a total of £19,108.

Expenditure.—The expenditure of the Council for the past year amounted to £19,071. The surplus on the year's working is therefore £37, which reduces the accumulated deficit at the date of the last account to £2053.

Reserve Fund.—The reserve fund of £1000 shown in the last account remains intact.

D. Milne-Watson, *President.*
W. J. Smith, *Secretary.*

SIR DAVID MILNE-WATSON'S ADDRESS.

The President: I now have pleasure in moving that the annual report and statement of accounts of the National Gas Council for the twelve months ended March 31, 1928, a copy of which has been sent to each member of the Council, be approved and adopted.

When we last met, we were recovering from the effects of the disastrous coal stoppage of 1926; and though recovery in the case of our own industry was rapid, it has been less so in other industries, and we have reason, therefore, to congratulate ourselves, not only upon the state of industrial calm which has prevailed during the period under review, but also upon the signs of revival which in some cases at least have manifested themselves. No industry, however efficient, however well organized, and however contented—and I think we can say without fear of contradiction that ours is all three—can stand alone. It necessarily depends to a greater or less extent directly or indirectly upon other industries. We therefore wel-

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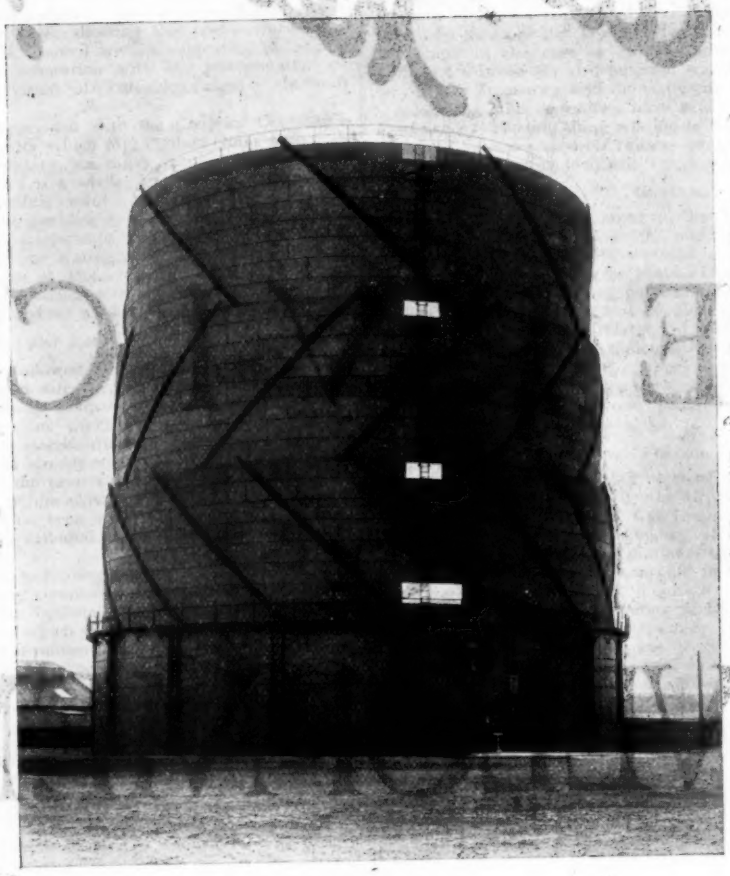

erected at the Kilmarnock Corporation Gasworks.

C. Fairweather, Esq., *Engineer.*

— 1928 —

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come such prospects as there are of a general trade revival in this country, and in the meantime are thankful for the opportunity which we have had of consolidating our position after passing through a troubled period.

THE INDUSTRY PLAYS ITS PART.

It must always be remembered, however, that until we are relieved of the legislative shackles which impede our progress, we shall not be able fully to realize our aim of establishing gas in its rightful place as the most efficient and satisfactory fuel for both domestic and industrial purposes. We in the industry have played, and are playing, our part; but those in Government circles who are supposed to have at heart the interests of all concerned with the industry, and particularly the interests of consumers, show by their apathy that they fail to realize that the extended use of gas is dependent upon a greater measure of freedom being accorded to us in the conduct and development of our business—a freedom for which we have been waiting since 1925.

PROPOSALS FOR NEW LEGISLATION.

At our meeting last year, I expressed the hope that a Bill embodying our proposals for the amendment of the legislation under which the industry works would be introduced during the early part of the present Parliamentary Session. I fear that, unmindful of the fact that a Bill of this kind presents no attractive electioneering features—I was unduly optimistic. I feel, however, that we have just cause for complaint on the ground that our claims have not been met. Our industry performs a great national service; and it cannot be denied that its progress has been, nd is being, seriously retarded by the restrictions imposed upon it by legislation which is now quite out-of-date.

As you have seen from the report, the Council's proposals regarding new legislation, together with the Board of Trade's views thereon, which, as you will remember, are for the most part favourable, were submitted by the Sub-Committee of the National Fuel and Power Committee to various bodies for their observations. Some of these have already reported, but one has not yet done so. The delay is inordinate, and the Council has made, and is making, strenuous representations in several directions with a view to expediting matters.

The remitting of this matter by the Government to the National Fuel and Power Committee has resulted in another complication which could hardly have been foreseen. I refer to the intervention of the coke oven industry. Their temerity in suggesting that gas undertakings should be obliged by law to take their surplus coke oven gas might with fairness be described in terms a great deal stronger than I am accustomed to use at our annual meetings. [Laughter.] To have to meet competition in the open market from coke oven coke, however, serious such competition may be, is all in the day's work; but to be compelled to purchase the gas produced in the manufacture of that coke would be intolerable. Not unnaturally, the Sub-Committee adopted the view that the time had not yet arrived for taking legislative action to extinguish our industry, and suggested that the question of the disposal of their surplus gas might be discussed by representatives of the coke oven industry with the gas industry. This eminently rational suggestion is being acted upon; and I hope that results satisfactory to both parties may be the outcome of the discussions which are now going on.

GOVERNMENT RATE RELIEF SCHEME.

While speaking of legislation affecting the industry, I wish to mention one matter which, although it does not fall within the period under review, is engaging our anxious attention. I refer to the fact that the Chancellor of the Exchequer, in outlining the scheme of rate relief which is to be accorded to productive industry, indicated that, after careful consideration by the Cabinet, gas, in common with two other public utilities, was to be excluded from participation. Bearing in mind the fact that the gas industry is a basic exporting and competitive industry, and bearing in mind also that other productive industries, whether depressed or not, are to obtain a large measure of relief from the ever-growing burden of the rates, there appears to be no valid reason for any differentiation; and the case for the inclusion of gas is being vigorously pressed. A letter setting out the Council's views has been sent to the Chancellor of the Exchequer; and he has been asked to receive a deputation, in order that the matter may be more fully discussed. You may rest assured that we shall do our utmost to secure the relief which we feel is justly due to our consumers. Our case is a strong one, because this relief would be extended not only to a population of not less than 30 millions (the majority of whom are members of the working-classes), but would in addition be afforded to those industries and trades which to an ever-increasing extent are employing gas for heating processes.

GAS CHARGES.

Intimately connected with the question of gas legislation is that of gas charges; and as that subject forms a separate item on to-day's agenda, I do not propose to touch upon it now. I do, however, wish to take this opportunity of conveying to Mr. Botley and to the members of the Committee over which he presided the grateful thanks of the Council for the admirable work which they have carried out on our behalf. I feel sure you will agree with me when I describe the Committee's report as a monumental work. It will remain a permanent testimony to the value of the results of the co-operation which this Council secures from those engaged in the industry.

BRITISH ROAD TAR ASSOCIATION.

Very soon after our meeting last year the draft constitution of the British Road Tar Association, to which I then referred, was ratified. The Council, as such, is thus divested of a considerable measure of responsibility; but as individuals representative of gas undertakings which produce tar, our responsibility in many cases still subsists. It is with satisfaction, therefore, that we hear that the Association is successfully surmounting the difficulties which beset its path; and we hope that it will very soon find itself upon a road possessing all the good qualities which characterize a tar-treated highway.

RATING AND VALUATION ACT.

There is not yet sufficient information to enable me to present to you a comprehensive picture of the results upon the industry of the putting into operation of the Rating and Valuation Act of 1925. The re-valuation of the whole country is still in process of being carried out, and at present rating authorities are chiefly engaged in obtaining information upon which to base assessments. In the meantime, the District Rating Committees are rendering valuable assistance to the members of the Council, and the other arrangements made by the Council for the benefit of members are working smoothly. The number of cases reported to the headquarters of the Council in which there is serious dissatisfaction with a new valuation is as yet small; and in most of these there is some abnormal feature which has led to a divergence of view between the undertaking and the valuer to a rating authority.

It must not be assumed that this comparative immunity from serious difficulty will continue. As the work of re-assessment progresses, and new valuation lists are issued, cases of real grievance must inevitably reveal themselves; and I have no doubt that we shall have to seek, to an increasing extent, the good offices of our District Rating Committees. It is all the more comforting, therefore, to remember that these Committees, by the excellent spade work which they have already done, have placed themselves in a position to render immediate assistance. May I take this opportunity of emphasizing once more how important it is, both in the individual and in the general interest, that no valuation notably higher than the existing valuation should be agreed with the rating authority without first referring to the District Committee or to headquarters?

CONJOINT CONFERENCE.

Reference is made in the Report to the Council's co-operation, through the Conjoint Conference, with other public utility undertakings in rating questions common to all. This co-operation has proved—as in other matters—highly useful, and as the results of the working of the Act become more apparent, will become increasingly so. To touch upon all, or even the more important, of the other matters with which the Council has dealt during the past year is impossible within the time at my disposal. I must therefore confine myself to a few matters of general interest, and even these in as brief a manner as possible.

WORLD POWER CONFERENCE.

First, a word or two as to the World Power Conference, a meeting of the Fuel Section of which is to be held in London from Sept. 24 to Oct. 6, this year. Arrangements for the conference are well advanced, and the favourable response given to the Technical Committee's proposals by the various countries represented augurs well for a most valuable and important conference. As you will have seen from the Report, British contributions to the Section dealing with carbonization are being prepared under the auspices of the Joint Committee of The Institution of Gas Engineers, the Coke Oven Managers' Association, the Fuel Section of the Society of Chemical Industry, and the Institute of Fuel. It behoves us as a Council to do all we can to contribute to the success of the conference, and to keep gas well in the forefront. As many members as possible are therefore requested to attend; and if they notify their wish to do so, they will be kept informed of the arrangements.

RESTRICTIONS ON GAS IN MUNICIPAL HOUSES.

The fact that you recently received from the headquarters of the Council a questionnaire regarding the restrictions upon the use of gas in municipal houses, will have shown you that this matter continues to engage our attention. A considerable number of cases in which, by one means or another, local authorities have sought—in some cases with success—to force their tenants to take a supply of electricity by prohibiting the use of gas, have come to our notice. Representations have already been made to the Ministry of Health; and with the information received in response to the questions put, it is hoped to prepare a case which will be unanswerable. Certain

undertakings have successfully resisted, by means of local Press campaigns and otherwise, the attempts of their local authorities to impose restrictions; but it is most desirable that it should be authoritatively laid down that in all cases the tenants of Council houses shall be free to use any medium of heat, light, and power which they may desire. ["Hear, hear."]

Electric Lighting (Scotland) Act.

In its efforts to be of service, not only to the industry as a whole and to individual undertakings, but also to sections of our organization, the Council during the past year has had to deal with important matters affecting Scotland and Ireland. In regard to Scotland, you will recollect that the memorandum on new legislation submitted to the Board of Trade contained a proposal that the Schedule to the Electric Lighting (Scotland) Act, 1890, should be amended. Under that schedule, it is held that a deficit in the working of a municipal electricity undertaking may be made good out of the receipts of the gas undertaking, and that the price of gas may be increased to meet such deficit. This iniquitous principle has been put in practice in more than one case. Bearing in mind the tendency on the part of local authorities to embark on grandiose and costly electricity extensions, that such claims may eventually become a charge upon gas, and also in view of the dilatory way in which our main memorandum is being dealt with, it has been thought wise to submit to the Secretary for Scotland a special memorandum containing the proposal that the schedule should be amended forthwith, and that municipal electricity should be put on the same footing as gas in the matter of charges. The principle underlying the provision as to municipal gas charges in Scotland is that the price charged for gas shall be sufficient to make the gas undertaking self-supporting. The same principle underlies the "Northumberland" clause; and for that principle we have always fought, and will continue to fight.

Legislative Activity in Ireland.

In Ireland, the Free State Government has been displaying legislative activity which affects our members there both directly and indirectly. To the Electricity Supply Bill which has now become law, the Council submitted several amendments; and we note with satisfaction that most of these have been incorporated in the Act. One clause on the lines of our old friend the "Northumberland" clause embodies the principle to which I have just alluded; and it is instructive to compare the Free State's frank recognition of its soundness with the grudging, and so far partial, acquiescence which, with an infinity of pains, has been dragged from the Electricity Commissioners in London. The Free State Government also has on the stocks a Bill for the amendment of the Gas Regulation Act in Ireland; and in connection with that Bill, one of the Managers recently attended a meeting of representative Irish undertakings in Dublin. The meeting agreed that certain amendments should be sought; and a subsequent interview with the Minister in charge of the Bill has given rise to the belief that some at least of these amendments will be accepted.

Finance.

And now, in conclusion, a few words on the subject of finance. The statement of the Council's accounts is before you; and as Mr. Cash will be dealing in detail with some of the items contained therein, I do not propose to touch upon them. But there are two matters of general interest to which I would like to make reference. First, you have seen in the report that the total amount received by way of joint subscriptions to the National Gas Council, the British Commercial Gas Association, and The Institution of Gas Engineers during the past financial year amounts to £69,623. Looked at from one point of view, that appears a considerable sum of money; but when you consider the magnitude of the industry which subscribes it, and the importance of the services which are obtained for it, it seems a comparatively small sum; while looked at from the point of view of the British Commercial Gas Association it is quite inadequate. I think we are all firm believers in the statement that "it pays to advertise;" and the British Commercial Gas Association, which has done, and is doing, such excellent work in this direction, is limited in its advertising activities only by the amount which it has to spend. The Joint Finance Committee of the national bodies, which has given the matter most earnest consideration, has therefore agreed that the British Commercial Gas Association should be authorized to make unofficial requests to undertakings likely to respond that they should increase their subscriptions from 6s. to 7s. 6d. per million c.ft., on the understanding that in all cases the extra 1s. 6d. will be spent on publicity in the district from which the increased subscription has been obtained. No circular asking for this increase in the existing scale will be issued. On the other hand, now you know the position, it is unnecessary for those undertakings which are willing and able to make a voluntary increase in their subscription, to wait to be asked to do so. If they subscribe now, they will spare the British Commercial Gas Association any blush which they might be able to produce when timidly asking for an increase, and they will have the assurance that the additional sum subscribed will be spent directly in furthering their interests.

The other point of interest to all the national bodies which I wish to mention is that the Joint Finance Committee has agreed that the amount received in ordinary subscriptions—*i.e.*, at the rate of 6s.—should be allocated in the following way:

National Gas Council, 30 p.ct.
Institution of Gas Engineers, 10 p.ct.
British Commercial Gas Association, 60 p.ct.

Nothing tends more to upset harmonious relations than discussion as to how a particular fund is to be divided; and I think that the Joint Finance Committee is to be congratulated on agreeing upon an allocation which must strike us all as eminently reasonable.

RESOLUTIONS.

Mr. William Cash, in seconding the resolution for the adoption of the report and accounts, said that, before touching upon the accounts, he would like briefly to touch upon the rate relief proposals of the Chancellor of the Exchequer. The letter dealing with the subject which had been addressed to the Chancellor had been circulated in the "Monthly Report;" this was followed in the report by an interesting extract from the Budget speech from "Hansard." In this occurred the passage: "The public utility undertakings—gas, electricity, and water—are outside the scheme. For long we debated whether they should be in or out; but we came to the definite conclusion that they should remain outside." It seemed to him a little unfortunate, if the matter was in doubt, that no communication was addressed to the utility undertakings to ascertain their views, because in other industries such opinions were sought. There were two things which seemed to him to give the gas industry, in asking to be brought into the benefits to be conferred, very strong claims to consideration. One of these, to which the President had made reference, was the fact that, situated as the gas industry was under the special legislation which applied to it, any benefit arising from inclusion in the proposals would be shared by the consumers. When they saw other productive industries eminently prosperous, and obviously not in need of financial assistance, being given the aid contemplated, it did seem a most extraordinary thing that the gas industry, who were in a position to pass on to the consumer any benefit that would be derived, should be cut out of the proposals. Another matter which strengthened their position was that they founded their case largely upon the fact that they were—particularly with regard to export—a competitive trade; and it seemed exceedingly strange that this benefit should be withheld from them and extended to their competitors, and might be used by them in reducing the price of residual products in which the gas industry was concerned. The effect of this might be to bring down the prices which the gas industry would be able to realize, which result might, in certain cases, bring about an increase in the price of gas. This was a point which they should emphasize as strongly as possible when they got into close touch with the authorities. Then with regard to coal, the railway companies, who were granted relief, were to pass it on; but it was not clear that that benefit was to go to all consumers of coal alike. He could not, however, believe that there was any substance in this suggestion. These matters were, however, engaging the close attention of the Council, and would not be overlooked.

Good Work of the "B.C.G.A."

With regard to the voluntary increased contributions, amounting to an additional 1s. 6d. per million c.ft., by certain gas undertakings, to be applied to the British Commercial Gas Association, he would like to bear testimony to the good work of the Association. So far as his own Companies were concerned, they had all agreed to contribute the extra 1s. 6d. He hoped that no one would grudge this money. When one considered the sums laid out by other industries on advertising, the amount spent by the gas industry in this way was not large, having regard to the magnitude of its business. ["Hear, hear."] The general bringing forward of the claims of gas had made the industry totally different from what it was a few years ago. This continual keeping of the industry in one form or another before the public had had the effect of bringing the gas industry very much more to the front. ["Hear, hear."] Anything in addition that they felt able to subscribe in this direction would be money well spent.

Touching briefly upon some of the main items in the accounts, Mr. Cash remarked that the total of £69,623 for subscriptions compared with a figure of £58,034 for the previous year. This was mainly due to the fact that they received an additional 1s. per million c.ft., which came to £8900 odd. The President had alluded to the extra sum paid to the "B.C.G.A.," which they had used to such great advantage. They only got £7500 more last year than in the previous twelve months.

The President remarked that he agreed with every word Mr. Cash had said with regard to rate relief; but the matter did not really stop where he had put it, because what was lost on the rates would have to be made up out of Imperial taxation, and the gas industry would in this way have to find money in

order to allow certain other people, like the coke oven industry, to compete with them.

GAS CHARGES.

With regard to gas charges, he might say that, in view of certain decisions which had been come to quite recently by a Joint Committee of the Lords and Commons in connection with two Bills now before Parliament, the Council had that morning decided to refer back to the Committee the whole question of gas charges, minimum dividends, and basic prices. They had added to this Committee Mr. William Cash and himself. The Committee would go into the whole matter again, and report to the Central Executive Board in due course.

The resolution for the adoption of the report and accounts was then put to the meeting and carried unanimously.

THE PRESIDENT.

Alderman J. H. LLOYD (Chairman of the Birmingham Corporation Gas Department) then moved a resolution inviting Sir David Milne-Watson to be President of the Council for the ensuing year. Sir David was, he said, an invaluable President, and a great asset to the whole of the gas industry. To ask him to remain at the head of this important organization was perhaps the greatest honour they could do him; and it was an honour of which he was in every way worthy. They all placed implicit trust in his skill and guidance.

Mr. H. D. MADDEN (Cardiff), in seconding, said he had, as President of The Institution of Gas Engineers, been very closely in touch with Sir David during the past year; and he had been able to see for himself the wonderful grasp that he had got of all matters appertaining to the gas industry. The National Gas Council was a most important body; and he could only say that those of them who had referred difficult problems or complications to Sir David or the officers had received the most helpful advice and support. It was a delight to all that Sir David had consented to act again as President.

The resolution having been carried with acclamation,

The PRESIDENT remarked, amid laughter, that proposers and seconders might come and go, but apparently he had to go on for ever—or, at any rate, as long as he was able. He could assure them that it was one of the chief pleasures, as well as one of the chief duties, of his life to further the interests of the gas industry. If he could be of continued use to them by occupying the chair for another year, he would feel it his duty to do so.

OTHER OFFICERS.

Moved by Mr. FRANK PRENTICE, and seconded by Mr. A. M. GREGORSON, the re-election was carried of Alderman Sir William Kay as Hon. Treasurer, Alderman H. Wade Deacon, C.B.E., and Alderman J. H. Lloyd, M.A., as Trustees, and Mr. F. W. Goodenough, C.B.E., and Mr. W. E. Price, A.M.Inst.C.E., as Hon. Secretaries.

On the proposition of Mr. J. E. NORMAN, seconded by Mr. OCTAVIUS THOMAS, Mr. Alfred Morland, F.C.A., was re-appointed Auditor.

VOTES OF THANKS.

The PRESIDENT, proposing a hearty vote of thanks to the Chairmen and Secretaries of the District Executive Boards for their services during the past year, emphasized the great value of the work done by these Boards in furthering the efforts of the central organization.

Col. G. S. EUNSON (Northampton) seconded the vote, which was cordially passed, and suitably acknowledged by Mr. J. H. SILLITOE (Manchester).

The PRESIDENT next proposed a similar compliment to the Finance and other Committees of the Council. The work of the Council, he said, was done very largely in committee; and it was very well done.

Mr. R. E. GIBSON (Liverpool), in seconding, referred specially to the work of the Gas Charges Committee. He said they all felt great admiration for the remarkable and extremely valuable report that this Committee had produced. Its compilation had entailed a tremendous amount of work. The vote was carried unanimously.

In acknowledging the vote, Mr. A. W. SMITH (Birmingham) referred to the fact that during the twelve months under review no less than sixty meetings of various Committees had taken place.

The PRESIDENT remarked that one other pleasant duty remained for him to perform, and that was to propose a very hearty vote of thanks to Mr. Fottrell, Mr. Ogilvie, Mr. Smith, and the other members of the staff. He did not think that any organization had a better staff. They always seemed to be "on the spot," both physically and mentally; and they were most fortunate in having such men with them. [Applause.]

Mr. FOTTRELL, returning thanks on behalf of himself and his colleagues, said the vote was highly appreciated; but at the same time all the members of the staff recognized how greatly they were indebted to the President and every member of the Council for the assistance that was given them in their work.

MIDLAND ASSOCIATION VISIT WILLENHALL.

A District of Many Industries.

Many industries, on both a large and a small scale, are carried on in Willenhall and its neighbourhood; and this, of course, offers better opportunities for even progress than would dependence upon the "ups and downs" of any particular trade. These opportunities are taken full advantage of; and the members of the Midland Association of Gas Engineers and Managers, when they visited the town for their spring meeting, on Thursday, May 24, found evidence of present well-being combined with a healthy spirit of optimism with regard to the future. Mr. W. G. S. Cranmer, the President of the Association, has for many years been Engineer and Manager of the Willenhall Gas Company; and his Chairman and Directors extended to the members a right royal welcome on the occasion of the visit. It is always gratifying to see proof of appreciation of good services; and of such proof there was abundance at Willenhall. Mr. F. W. Pinson (the Chairman of the Company), at the annual meeting of the Association last March, when extending, on behalf of the Board, a cordial invitation to the members to visit the town, said the Directors would show them what they regarded as a very good gas undertaking indeed. This description of the undertaking was one with which the members found themselves in agreement after having heard Mr. Cranmer's Presidential Address; and in that opinion they were confirmed as the result of actual inspection of the works. As was remarked by Mr. F. C. Briggs, when proposing a vote of thanks to the President for his address, the ultimate measure of the success of the members is the price at which they are able to supply gas to the consumer; and judged by this standard, Mr. Cranmer has been particularly successful in the running of his undertaking.

AT THE GAS-WORKS.

The day's proceedings opened at the gas-works, where the Chairman of the Company and the President were in readiness to welcome the visitors; and here the Chairman congratulated the Association upon having Mr. Cranmer as their President, and Mr. Cranmer upon having had the honour of that position conferred upon him. As became a small town, he said, the works were small; but they were fully as efficient as was warranted by the small capital. He trusted Mr. Cranmer would remain a long time with the Company, to render further good service.

A great deal of interesting information regarding the undertaking was given by Mr. Cranmer in his address, delivered at the March meeting, to which readers are referred. The district supplied by the Company is very compact, and essentially industrial, consisting mainly of factories and workmen's houses. There is no considerable number of better-class houses, as many of the manufacturers live outside the district, and the Company has had to depend primarily for its growth on the adoption of gas for numerous manufacturing operations and the encouragement of its use for domestic heating. The population supplied is about 29,000, in rather less than 5800 houses; while there are actually in use 6286 meters, not including discount meters. The excess in number of meters over that of houses is due to the large number fixed in factories. The consumption per mile of main is high for a small town, being nearly 9 million c.ft. per annum; and though in a portion of the district there is a considerable mining population who get free coal, 64 p.ct. of the private consumers use cookers, and the number is rapidly increasing. The use of gas fires or other heating apparatus is encouraged by a liberal concession in the charge for gas consumed; the rates being the same as those charged for manufacturing purposes. For arriving at the rate to be charged, the quantity used in a factory for manufacturing and/or heating is added to the quantity used for heating in the private houses of any members of the firm who may be living in the town. This policy has given great satisfaction to the consumers, and has at the same time been of considerable benefit to the Company.

The first retort house contained a bench of seven arches, each designed to take eight 22 in. by 16 in. by 10 ft. stop-end Ω-section retorts; five arches only being filled in. The retorts were heated by Klönne regenerative settings, as modified by the late Mr. R. O. Paterson, of Cheltenham. Instead of the usual hydraulic mains, cast-iron dry mains were installed. The ascension pipes were of unequal lengths, the object being to cause the gas to travel the same distance from each retort to the dry main. To replace the hydraulic seal, a butterfly valve

was fixed in the centre of each bridge pipe; but this constituted a continual source of trouble, owing to the accumulation of thick tar or pitch which collected on the valve discs, causing frequent stoppages. In the remodelled house Mr. Cranmer has adopted hydraulic mains and Cort anti-dip valves, giving the advantages of both hydraulic and dry mains without their disadvantages.

An additional retort house was built in 1901, having eight beds of single retorts similar in section to those in the old house. West manual stoking machinery was installed in this house in 1912, and continued in use until 1919, when, owing to the greatly increased cost of labour, it was decided to remodel No. 2 house, and the retort bench was rebuilt to accommodate 20-ft. through retorts. To do this, practically the whole of the lower half of the back wall of the house was removed; the upper portion being supported on R.S.J. stanchions, which were at the same time to act as buckstays on the discharging side of the bench. A steel-framed annex was built on this side to provide shelter, but as much as possible was left open; the result being most satisfactory from the point of view of ventilation.

At the same time Guest-Gibbons stoking machinery was installed, together with a telpher for coke handling. Owing to the excessive cost of ironwork at the time the work was being carried out, the existing retort mouthpieces were re-used. Consequently full advantage could not be taken of the stoking machine. Under more favourable conditions, 24 in. by 16 in. or 18 in. retorts would have been adopted. The head-room, too, under the extended portion of the house, prevented the telpher track being constructed as high as desirable. Another 5 ft. in height would have increased the coke-stacking capacity by nearly 100 p.ct. The carbonizing plant in No. 1 house was scrapped, as, owing to its situation, it was impossible to instal machinery; and a portion of the building is now occupied by a Davison & Partner carburetted water gas plant having a nominal capacity of 500,000 c.ft. per day. This water gas plant is only used for the peak load in winter and for emergencies. There are two gasholders, of 370,000 and 430,000 c.ft. capacity respectively. Having no relief holder, the smaller of the two is used for this purpose when working the plant, leaving an effective storage of 430,000 c.ft. for mixed gas. As the maximum day's output approaches 1,250,000 c.ft., and nearly 800,000 c.ft. of this is taken between the hours of 6 a.m. and 6 p.m., the position as regards storage accommodation is not what Mr. Cranmer would wish.

In 1924 the Directors decided to replace two of the old 20 ft. square purifiers with new ones 30 ft. square by 6 ft. deep, with rubber jointed covers, as the first instalment of a complete set. The site selected consisted of an ash tip together with material removed from excavations in other parts of the works. After careful examination Mr. Cranmer decided to build the boxes in a reinforced concrete tank; and in spite of the unsatisfactory nature of the foundation, there has been no trace of settlement. As the purifiers were to be built in the open, with the slightest protection (the works are particularly exposed, and bleak), the boxes were sunk to within 9 in. of the top. This resulted in a comparatively even temperature being maintained.

Luncheon.

Conveyances in waiting afterwards took the members to the Chamberlain Hall, where a party of about a hundred sat down to luncheon, as the guests of the Chairman and Directors of the Willenhall Gas Company, with Mr. F. W. Pinson in the chair. Mr. Pinson, indeed, proved himself an indefatigable host, for he spent the whole day with the visitors, and omitted nothing that could add to their enjoyment. This kindly feeling was shared by his wife, to whose thoughtfulness each guest present owed a pretty souvenir in the form of an extremely diminutive gilt padlock and chain, made in Willenhall. At the luncheon, Mr. Pinson was supported by Major F. Holcroft, Mr. J. Legge, J.P., and Mr. A. Marston (Directors of the Company). Mr. H. Holcroft, M.A. (another Director), was unfortunately absent through illness.

After the toast of "The King" had been honoured at the call of the Chairman,

A Wise Policy.

Mr. G. R. Thorne, M.P., proposed "Willenhall Township and Industry." He said that his association with the district was somewhat prolonged, for he came to Wolverhampton no less than 49 years ago. At that time there were many people who said he had made a great mistake in coming there, as the town and district were on the down grade. There were industrial Jeremiahs in those far-off days, just as there were now. However, since then, in Willenhall and Short Heath, as well as in Wolverhampton, there had been progress, instead of retrogression. This had been largely due to a wise policy; for the people had not confined themselves to one or two heavy trades. Probably the rates constituted the greatest burden resting upon the towns to-day. This was a question which had to be looked at from the point of view of the trade of the country. That was to say, it had to be ascertained whether any proposals put forward would be likely to assist trade as a whole. He believed that there was a great future before this country, and he begged them all to take heart, and not to believe that everything was going to the bad. This was the greatest country on God's earth; and he believed in maintaining it as such. The younger generation would, he thought, see greater developments in the future than any which had taken place during his lifetime.

In the absence of the Chairman of the Willenhall Urban District Council, the toast was first responded to by Mr. C. H. Pinson, J.P. He was followed by Mr. G. F. Baker (Clerk to the Short Heath Urban District Council), who remarked that in 1871 Short Heath was separated from Willenhall; but since the separation Short Heath had had the benefit of the Willenhall gas supply.

Proud of the President.

Mr. Baker went on to say that Short Heath was proud of the President, who had been a member of their Council for nine years, during which time he had rendered yeoman service. He had passed through the chair; and at the present time was serving on one of the most important Committees, of which he was Chairman. If Short Heath had decided to have their own gas undertaking, they could not have worked it on more economical lines than Willenhall had done. They enjoyed a cheap and abundant supply of good gas; and during the difficult times of recent years, industries in the district had benefited from this fact. They also felt proud of the President on this account.

The Great Gas Industry.

Mr. C. M. D. Belton (Vice-President), proposing "The Willenhall Gas Company," remarked that the Company had been in existence for nearly a century, and had had statutory powers since 1857. The works were moved to Short Heath 35 years ago, when the make of gas was 50 million c.ft. per annum. This figure was now increased to 260 millions, and no one could deny that such progress was highly creditable to the Directors and officials of the Company ["Hear, hear."], and worthy of the great industry of which they were all so proud. Great indeed the industry must be acknowledged

SPRING MEETING OF THE MIDLAND ASSOCIATION.

to be, which embraced 780 gas undertakings in Great Britain, supplying light, heat, and power to 4 million consumers through ordinary meters and 5 million consumers through the convenient slot meters. This enormous business was being not merely maintained, but increased, in spite of the competition of State-aided electricity. The Board of Trade returns showed that during the last seven years, 1 million new consumers had been secured by the industry; and the sales of gas had increased by 17½ p.ct. In Willenhall during the same period the production of gas had increased by 80 million c.ft., and 700 new consumers had been added—truly a flourishing state of affairs, worthy of commendation in the highest terms. On behalf of the members, he thanked the Chairman and Directors of the Company most heartily for their kind welcome and hospitality.

The Chairman's acknowledgment was followed by the toast of "The Midland Association of Gas Engineers and Managers," which was submitted by Mr. J. LEGGE, and replied to by the PRESIDENT.

VISITS TO WORKS.

For the afternoon, several visits to works had been arranged, in order that members might be enabled to form some idea of the nature of the industries in the district. One party went to the works of Messrs. John Harper & Co., Ltd., the Albion Works, Willenhall; while the second party proceeded to the lock making works of Messrs. H. & T. Vaughan, Ltd., Unison Street, Willenhall. The lock factory is one of the largest, if not the largest, in the world; the output averaging 6 tons a day. Then both parties met at the works of Messrs. Rubery, Owen, & Co., Darlaston, where some very big stamping and pressing work in connection with motor parts was seen. Tea was taken in the mess-room at these works, by invitation of Mr. A. E. Owen, the proprietor.

John Harper & Co., Ltd.

At the works of Messrs. John Harper & Co., the party were received by the Managing Directors and members of the staff, and passed first through sections of the foundry, sand mill, and sandblast departments. From here they went to the manufacturing side of the works, proceeding by way of the press shops and machine shops, to the japanning, plating, and vitreous enamelling shops. In the assembling department there was seen a comprehensive display of the Company's products, including specially gas rings, "Beatrice" gas heaters, and a range of "Beatrice" gas fires of different sizes and finishes. The features of these fires, including the patent tap, were demonstrated and explained in detail. A visit was then paid to the new tinning shop, which has been laid out to deal with 500,000 meat choppers per annum.

Leaving the old works, the party proceeded to the new foundry at the Clarks' Lane site, and inspected the mechanical and labour-saving equipment with which this foundry is replete. The visitors were much interested in the cupola charging plant, and in the various stages of the moulding and casting of component parts for gas heating appliances.

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

Visit to the Halton Tube Works, Cheshire.

By the invitation of the Directors of Messrs. John Russell & Co., Ltd., Walsall, the Manchester District Institution of Gas Engineers paid a visit, on May 18, to the Company's new works at Halton, near Chester, where the latest methods in the manufacture of wrought-iron tubes were demonstrated. The party was welcomed by Mr. C. A. J. Brown, Managing Director of the firm; and about eighty members of the Institution and visitors attended.

The party were subsequently entertained at luncheon and tea at the Blossoms Hotel, Chester; and during the course of the afternoon there was a delightful trip up the River Dee to Eccleston Ferry.

The firm of John Russell & Co., Ltd., which has a well-deserved and world-wide reputation for its products, was established in 1811, and has its headquarters at the Alma Tube Works, Walsall, Stafford. With it is associated the equally well known firm of James Russell & Sons, Ltd., which was established at an even earlier period—namely, 1809—and which carries on its operations at the New Crown Tube Works, Wednesbury. Other undertakings connected with these Companies are the Cyclops Iron Works, Walsall; the Old Patent Tube Works, Wednesbury; the Crown Tube Works, Wednesbury; the Belmont Brass Works, Birmingham; and the Anchor Tube Works, Halton. For the carrying-on of the commercial side of the businesses, there are six warehouses in London, two at Manchester, two at Leeds, one at Bristol, one at Birmingham, and one at Sheffield.

Mr. R. H. GINMAN (Leek), President of the Institution, occupied the chair at luncheon, and was supported by Mr. C. A. J. Brown.

Mr. W. B. MCLUSKY (Halifax), Vice-President of the Institution, proposed the toast of Messrs. John Russell & Co., Ltd., Walsall, and the associated Company, Messrs. James Russell & Son, Ltd. He had come to the conclusion that not only did these firms turn out good products, but that they must also have a good salesman in Yorkshire, because the Halifax Gas-Works used their tubes. At the times when the firms of Russell commenced business—namely, 1809 to 1811—James Watt and William Murdoch were both working in the same neighbourhood, without having, for the time being, created much demand for tubes, as the one had not perfected his steam engine, while the other had not commenced any serious gas producing operations. It was not until 1826 that there were any steam engines and any railways, or any great demand for tubes or pipes for gas undertakings. Nevertheless, it was characteristic of Messrs. Russell that they had already established themselves, and were ready and willing to undertake such business when the opportunity arose.

Mr. HAROLD DAVIES (Chesterfield), a Vice-President of the Institution, supported the toast. The visit to the Halton Works, he said, had been one of extreme interest. It was an excellent plan to establish such a works near the coast, in order that foreign competition might be successfully encountered.

The PRESIDENT also supported the toast.

MR. BROWN'S RESPONSE.

Mr. C. A. J. BROWN, in responding to the toast, expressed his regret that Col. Harrison, the Chairman of the combined Companies, had not been able to attend the gathering through indisposition. The actual originator of the visit, Mr. J. F. Syme, had also, unfortunately, been passing through a very trying period, owing to the loss of his wife, and was also, therefore, unavoidably absent. As a matter of fact, he had resigned his position in the Company. The ancient City of Chester had been selected as the meeting place, not only for its historical interest and the beauty of its cathedral, but also on account of the charm of its river. During the inspection of the works he had endeavoured to explain the difference between the present-day manufacture of tubes and pipes and that of a period even so recent as twenty or thirty years ago. Though the works at Halton were extensive, they were smaller than those which had been recently erected in the Midlands. He hoped to have the opportunity sometime of enabling the members of the Institution to see many more processes of manufacture than were carried on at Halton, commencing with the actual production of wrought iron. In their ironworks there were 23 puddling furnaces and two ball furnaces, while among the processes carried out by the Companies were the buttwelded process, the lapwelded process, the seamless process, coils, reservoirs, &c. The Belmont Brass Works manufactured great quantities of brass fittings for gas and water purposes. The Halton Works, as they at present stood, were to be regarded as the first unit of an extensive and greatly varied system of production. Additional furnaces were to be installed, and at the moment plans for development of the works were being awaited from overseas.

It might perhaps be of interest to recapitulate some of the processes which had been observed that day, and contrast them with those of former times. First of all, one commenced with laying hold of the strip, placing it under the pointing machine, cutting off the corners, and bulging it in order that the welder might handle it by means of his tongs. It was then charged by an electrical machine into the furnace from the back of the furnace, instead of, as formerly, charging by hand from the front of the furnace. Next came treatment in the furnace. The old type of furnace was coal-fired, and no one in the gas industry used to remind them then how much sulphur was present in the tubes and how much was not.

Formerly, tubes were made in two different ways, by bell and by tong, the more general being what was known as the "tong" process. First the strip was bent up, and then it was re-charged into the welding furnace, and was fore-ended and back-ended. This system had both its good points and its bad ones. It was certainly possible to obtain a good weld, but at the same time there was not freedom from oxidation, which was bound to be set up from a tube drawn in this manner, and it often led to an irregular thickness and gauge. To-day the strip was placed in a furnace the temperature of which was very closely controlled. The result was that there was little or no oxidation, and the tube was not thick and thin. It was sometimes argued that old methods were best with regard to welding. Personally, he could not endorse this point of view. Once a tube was turned into the circle, if the weld was not made at the first pass it was impossible to get it afterwards; but with the old form of the pippin skelp there was a series of operations, with reduction of area, and one did not obtain the weld until several passes had been made.

The next consideration was passing down the gates into the trough and into the sizing rolls. The function of the sizing rolls was to bring the tube into the circle, and produce it as near to the screwing size as possible. As they were all aware, an investigation was being made in London at the present time as to how near the tube trade could guarantee an outside diameter for screwing size; but the Committee of Inquiry, of which he was a member, had not been able to arrive at any definite decision upon the matter as yet. The point was of considerable importance, for screwing was a material factor in regard to tubes and pipes nowadays. A considerable amount of research work was being done upon the subject, and even the aid of photography and mirror devices was being enlisted in order to assist in solving the problem. The production of tubes could now be definitely stated to be a scientific process, and requirements were being met which had never arisen in the past.

The next stage to the sizing rolls was that of the cross rolls, which

straightened a tube and freed it from scale. The Halton Works were now awaiting machinery from overseas, in order to produce mist-spraying, the purpose of which was to cool a tube gradually and to free it further from scale.

The conveyor was the next piece of apparatus employed; the purpose of this being further to straighten the tube and so cool it that it could be handled with rapidity. Formerly it was the custom to straighten the tubes, and to roll them under a rocking plate, and in order to cool them quickly, a copious use of cold water was made, which in that form had its advantages.

It would be noted that considerable stress was laid upon the advantages gained by the use of modern machinery. All tubes, whether for gas, water, or steam, turned out by the Russell Works were tested under one definite hydrostatic pressure by means of a weighted accumulator; every tube being tested to 750 lbs. per sq. in. The screwing was done by chasers which gave far more accurate results than the old solid die. The machines installed at the works could be set to a nicety—in fact, almost mathematically.

The works on the coast and in the Midlands, when completed, would be absolutely second to none in the country. The firm had been cosmopolitan in the methods they had adopted, and had enlisted the services of the best engineering brains in the world in their endeavour to lay down a plant of the utmost utility. Tubes would be produced from ⅛ in. to 12¾ in. diameter.

He had been challenged by certain members of the trade as to why they had adopted that particular type of mill at the present time. His reply had been that, rightly or wrongly, Messrs. Russell were staunch believers in wrought iron coming more generally into use. If a hot roll process had been adopted, they would not have been able to supply a wrought-iron tube by that method. The hot rolling process was, of course, engaging the Company's attention, and would follow in due course; nevertheless, it was found that there was a steady increase in the demand for wrought-iron tubing, and special plant for its production had been provided. At the same time, he did not wish to overstress the point. His Company were at the service of each and all. If customers demanded steel tubes, they were quite prepared to supply them; on the other hand, if they demanded iron tubing, they would supply those also.

References had been made to the history of the Companies. All he could say was that the Directors were not ashamed of that history. Both Companies had been consistently and continuously in operation since the early days of the nineteenth century. There was now displayed in a prominent position, in the offices of John Russell & Co., Ltd., an invoice which had been recovered which was for the supply of the first gas barrel for the production of coal gas. Many had sought to acquire that document, but without avail, for the firm regarded it as a precious possession. Its date was in the early years of the nineteenth century.

For more than a century Messrs. Russell had been in the tube trade. Possibly they might sometimes have lagged behind a little in certain directions, but at any rate they were now pressing forward with greater energy and keener enthusiasm in their endeavours to cope with the requirements of their customers. Of one thing one and all might be certain—Messrs. Russell did not intend to lose the good name which they had gained throughout that century of trading. If service, attention, and the respect of their customers would continue that goodwill, then they were at the call of all those who required their products.

Mr. J. H. Crowther (Wallasey) proposed the toast of "The Visitors," which was supported by Mr. H. R. S. Williams (Altrincham), and to which Alderman T. Cook (Chairman of the Manchester Corporation Gas Committee), Alderman Pollard (Oldham Corporation Gas Committee), and Mr. H. N. Barrow (the Manchester representative of Messrs. James Russell & Co., Ltd., and Chairman of the Manchester City Justices Gas Meter Testing Station) responded.

Mr. J. W. Bottomley (Milnrow) proposed the toast of "The Lady Visitors," which was suitably responded to on their behalf by Mr. H. N. Barrow.

Mr. William Hill (Stalybridge) proposed the toast of "Mr. C. A. J. Brown," and expressed his deep appreciation of the kindness of Messrs. Russell in inviting the Institution to inspect the Halton Works. He now understood a great deal more about tubes than he had ever done before.

Mr. William Buckley (Droylsden Gas-Works) also associated himself with the toast. The conclusion he had formed from his visit to the Halton Works, he said, was that Messrs. Russell had spent a great deal of money in experimental work before they had arrived at the degree of perfection which they had now attained. Apparently, the secret of their success lay in the temperature of the furnace into which they put the strip.

Mr. F. Sidwell (Winsford) also supported the toast. He considered the tubes manufactured by the firm were most efficiently tested before being dispatched to the customer.

Mr. H. N. Barrow, as a member of the staff associated with Mr. Brown as Managing Director, expressed his appreciation of the value of Mr. Brown's services to Messrs. Russell.

Mr. Brown, in responding to the toast, said that in all his efforts on behalf of Messrs. Russell he had been ably assisted by the staff, so much so that he could not venture to particularize any individual member of it. Messrs. Russell had a big programme before them, and they intended to bring it to a successful consummation.

YORKSHIRE JUNIOR GAS ASSOCIATION.

The final meeting of the 1927-28 session of the Yorkshire Junior Gas Association took place on Saturday, May 19, at Elland, when the members, by kind invitation of the Directors of the Elland-cum-Greetland Gas Company, and of Mr. J. Bridge, the Engineer and General Manager, met in the Board-room at the Elland Works. Opportunity was taken to inspect the works, particular attention being paid to preparations now in hand for the installation of new condensing and washing plant, and coke-screening, grading, and storage plant.

The visitors were welcomed by Mr. Bridge—who is a firm friend of the Yorkshire Junior Association—and members of the staff.

TYPES OF MECHANICAL HANDLING PLANT.

By R. Crowther, of the Elland-cum-Greetland Gas Company.

The subject of mechanical handling appears to receive little attention in papers delivered to the Junior Gas Associations; and as the cost of these plants is no small item to a gas undertaking, I propose to deal with four types which are in general use.

Elevators.

The elevator comprises an endless chain or chains passing over top and bottom sprockets with buckets attached to the chains at a fixed pitch. The elevator should always be driven at the head. If the source of power cannot be brought to the head, suitable gearing must be provided to transmit the power to the head shaft. The base or elevator boot must be provided with a suitable take-up gear to adjust for any slackening due to wear of the chains.

It is much better that the elevator be fixed at an angle rather than vertically. When it is positioned vertically the whole of the weight of the chains, buckets, and material hangs from the driving gear, but when it is fixed at an angle a great part of the load is taken by the framework. Again, as the elevator is run at comparatively slow speed, with a vertical elevator it is difficult to obtain a really clean delivery, which necessitates the installation of larger buckets than would otherwise be necessary. There are cases where, owing to construction of plant or buildings, it is necessary that the elevator should be in the shape of a curve. This causes a certain amount of extra friction, resulting in increased wear of the skidder bars, guides, and chains, and is a construction to be avoided if possible.

The points of feed and discharge are usually fixed, and the inclination of the elevator is made to fit in with these conditions. The best position is at an angle between 55° and 65°, and it is not good practice to go below 45°.

Elevator Feed.

The material should be fed to the elevator evenly, as heavy intermittent loads are liable to choke up the elevator boot; and when the buckets have to scoop up the material, greatly increased wear is caused on the buckets, undue strain is placed on the chains, and power consumption is increased. In one type of feed regulator a slide oscillates backwards and forwards by means of connecting rods attached to adjustable eccentrics on the bottom shaft. Regulators are driven from the bottom shaft; and thus, should the elevator stop working through any cause, the feed also is immediately stopped, and no choking of the boot can take place.

It is usual to employ single chains with buckets up to 20 in. wide. When the elevator is inclined, it is usual to support both loaded and return strands. This is done by forming angle-iron supports and guides, on which are placed wearing strips usually of wrought iron or hard wood, and fastened together by means of countersunk bolts. Skidder bars attached to the buckets slide on these strips, and thus twisting or unsteady motion is prevented. The guides are curved slightly at the ends in order that the skidder bars may ride easily on and off. If it is not required to have the elevator encased, the guides may be suitably braced to carry the structure. When the elevator is totally encased, any material spilled from the buckets is returned to the boot by the casing; but if the framing is formed of lattice work, it is necessary to provide for the return of any spilled material to the boot by means of a return trough fixed to the underside of the elevator.

The shape and size of the buckets depend upon the type of material and the capacity required. Pressed seamless steel buckets and welded buckets may be obtained, or they may be built up from mild-steel or wrought-iron plate, the corners being formed by small angle irons. Another method is to have the end plates flanged, and rivet them to the body plate. If no feeding device is used with the elevator, the bucket must be thickened at the lip, to prevent excessive wear when scooping-up the material in the boot.

With all elevators there is a possibility of the chain breaking through the opening of a link or the shearing of a pin. This results in the loaded side of the elevator collapsing in the lower portion of the casing, and the return strand falling into the return trough. It is usually on the loaded side where the breakage occurs; and a safety catch may be employed on this

side of the chain. One type consists of a catch pawl fitted at intervals and operating on the slide bars. In case of a break, the pawls engage with the bars and hold the chain and buckets in position; the buckets on the return strand forming in the return trough.

BAND CONVEYORS.

The band conveyor has many advantages over other types of conveyor—*e.g.*, comparatively low cost, light construction, simplicity, high efficiency, low power required, and low maintenance charges. The principle of a band conveyor is that of an endless belt of canvas, indiarubber, or steel (which may be either flat or troughed) running over two terminal pulleys and supported on both delivery and return strands by idler rollers to prevent any undue sagging of the belt.

At one period, especially in the case of flat belts, it was accepted that the tight side of the belt should be used for conveying. Generally this would mean that the belt could only have the drive fixed at the delivery end. It is, however, immaterial at which end the belt is driven, for the conveyor is equally effective whether the load is carried on the tight or the slack side.

The tightening of a band conveyor may be accomplished by using a tension gear consisting of two screws to pull the pedestals of one terminal pulley away from the other. The objection to this method is that it is restricted in latitude, and is certainly only suitable for short belts with fixed throw-off carriage. Where long belts are in use, or movable throw-off carriages are employed, a tension carriage should be used. The latter consists of a pulley over which the belt passes, held in tension by weights. The pull should always be on the slack side of the belt, so that tightening, not stretching, takes place.

In order that wear of the belt by delivery of the material be not too great, the material should be delivered at a speed approaching the speed of the belt. This is accomplished by delivering on to the belt at an angle of about 42° to the horizontal, with the chute rather less than half the width of the belt. To ensure safe delivery, the chute may be extended along the belt a distance of 3 to 4 ft., with two rollers at the end. This has the effect of forming a trough at the point where delivery takes place, thus keeping the material away from the edges of the belt.

There are many conveyors of this type in use, both flat and troughed. By making a belt conform to the shape of a trough, its carrying capacity is increased. The method of troughing is to use one central horizontal supporting roller, with inclined supporting rollers at the side; and this is effective for small or medium sized belts. In the case of wide belts, however, it is much better to use five or more rollers, so that the belt may assume its own natural trough, rather than the comparatively sharp bend which occurs when only three supporting rollers are utilized. The supporting rollers consist of cast-iron pulleys running on hollow steel shafts. Small holes are drilled in the shaft in order to facilitate lubrication, which is carried out by means of grease cups at each end of the steel shaft. The grease is compressed through the small holes into the bearing. Grease is better than oil, as it is effective in preventing dust from entering the bearing. The idlers supporting the return strand are lubricated in the same manner.

Drive and end terminal pulleys should be of a good size, in order that the arc of contact between the belt and the pulley face may be large, to obtain the maximum effect. A belt conveyor may be used as an elevator; the maximum angle when dealing with coal being about 22°.

PUSH-PLATE CONVEYORS.

Under this heading may be classed together push-plate and drag-bar types, as the material to be conveyed is pushed along by plates or bars carried on an endless chain or chains. They find extensive use in horizontal retort houses. They are efficient in use, the coal may be deposited at many points along the run of the conveyor, and little attention is required. The power required to drive these conveyors is comparatively high.

There is no fixed rule to determine the pitch of the bars or the plates, the chief considerations being the width and depth of the trough, the type of chain to be used, and the capacity required. The trough is formed by two channel sections acting as sides, with the base formed from mild-steel plate. This sectional construction possesses the advantage that renewal of any bottom section can be carried out more expeditiously than when the trough is formed in one piece from pressed steel. Also, the channel sides form a good support to carry the weight of the chains, plates, and material.

The channels carry the cast-iron standards, which are braced together, carrying the angle-iron necessary to support the top or return strand of the conveyor. Many types of chain may be used with this conveyor. For a conveyor carrying up to 30 tons per hour it is usual to employ one strand only, but above this amount, or when it is desirable to have the trough unimpeded by chains above the plates, as is the case when conveying coke, it is usual to employ two chains.

The feed to the conveyor is usually through a side chute. A steady continuous feed is desirable, and is obtained if the coal is fed from an elevator or another conveyor. Should the feed be intermittent, a regulating slide should be placed in the chute, to govern the flow to the conveyor and thus prevent any sudden overloading, which increases maintenance and repair costs.

The discharge of the material is obtained by fitting slide doors in the bottom plate at any required position. These may be opened by hand or operated by rack and pinion. With this type of conveyor the drive should always be fixed at the end towards which the material is delivered, with tension gear at the loading end.

The thickness of the push plates used in a conveyor for carrying coal varies according to the size of the conveyor, and may be from $\frac{1}{16}$ in. to $\frac{1}{8}$ in.

The plates may be fitted with either skidder bars or rollers. The use of the latter reduces the power required to drive the conveyor. The skidder bars or rollers, as the case may be, run on renewable wearing strips of wrought iron or hard wood which are fixed to the channel sides and the return guide angle.

GRAVITY BUCKET CONVEYORS.

This type of conveyor is particularly applicable to vertical retort practice, acting both as conveyor and elevator. Generally they may be said to consist of two endless chains which are held apart by bars fixed at suitable intervals. Every second link of the chain carries a bucket, and thus the whole forms an endless chain of buckets. The buckets are suspended above the centre of gravity, so that, whether travelling vertically or horizontally, they always remain in an upright position until meeting some device which causes the bucket to tilt over and discharge the contents. The power required for this conveyor is low, being dependent chiefly upon the amount of elevating work to be done. The chains usually consist of flat steel links with steel pins. The rollers or runner wheels are single flanged cast-iron wheels. Two usual methods for lubrication are (*a*) to fix a Stauffers lubricator at the end of the spindle, the spindle having a hole bored down the centre to meet another at right angles; (*b*) to have a small oil-hole drilled in the hub of the roller. The rollers may be fitted at each link connection or at every other link, though, except in long conveyors, the latter is sufficient.

The buckets may be pressed from mild-steel plate, welded, or built up in sections consisting of end plates and body plates, as in the case of elevator buckets. On each side of the buckets are riveted combined cams and bearings so formed that any one bucket may easily be removed without disturbance to any other portion.

This type of conveyor is driven by two sprocket wheels which engage with the chains on both sides simultaneously and which are placed at a turn from the upward to the horizontal, or at the end of a horizontal run—the position being determined by the lay-out of the plant.

At the point where the conveyor changes the direction of travel are two free wheels; the tension gear (to take up any slack in the chain) being fitted to the bottom return guide wheels, and the shafts being fitted in tension bearings. It is fixed in this position because it operates on both horizontal and vertical strands, and therefore obtains as great an effect as possible.

In most conveyors of this type it is necessary to provide a special feeding device to avoid the material being spilled. This device may be fixed in a stationary position or may travel on rails to receive the material at any desired point. The framework of the filler is built up from steel sections, and carries the bearings for a rotating hollow casting. A sprocket wheel is bolted to this casting and engages with the link chain of the conveyor. The material is fed by a chute to the hollow casting; the rate of feed being adjusted to the size and type of material. To obtain the discharge of the conveyor, a pair of cams operated by a lever are brought into contact with the cams on the sides of the buckets, thus causing the buckets to turn, and discharge the contents.

Discussion.

The PRESIDENT (Mr. C. H. Chester, of Wakefield), inviting discussion on the paper, said the meeting had been given a highly interesting summary of the features of various types of elevators; and he felt sure that the paper must contain many points which would prove useful to members who might be called upon to decide on a type of plant to adopt for the purposes of mechanical handling on a gas-works. The details of the various types of plant had been explained clearly, and the members would benefit by reading the paper in the Technical Press.

Mr. BRIDGE remarked that Mr. Crowther had not been describing in particular the type of conveying plant which they had at Elland, though some years ago they did have to make a decision as to what type would best suit the purposes of the Elland Works, with their rather peculiar shape of site. In 1890, Mr. Porter, his (Mr. Bridge's) predecessor as Engineer and Manager, installed a novel plant for discharging coal from barges. It was an endless chain conveyor, and the coal was fed from the elevator and thrown out on to a band conveyor and then into the coal sheds. In those days this was a remarkable advance on previous plants. Gradually the plant became worn out, and had to be replaced; and the Company installed, some seven years ago, an electrical telpher and grab, which could be seen in operation to-day—a plant which conveyed the coal direct from the barges to the top of the vertical retorts, and which had proved most serviceable. During the six or seven years it had been working, the ropes had had to be renewed about twice, and one belt had been renewed once. The charges for maintenance on the belt

conveyor had run out at only about £10 per annum, excluding oil and waste; and about 10,000 tons of coal had been over the belt. They could discharge at the rate of 20 tons of coal per hour, which was a very satisfactory figure for a small works. In 2½ hours per day they could handle all the coal needed for carbonization, even at times of maximum load.

Mr. T. B. Mortimer (Brighouse) suggested that the elevator should not be totally enclosed. When it was, there was difficulty in replacing the chain on the sprockets.

Mr. F. Clegg (Huddersfield) said he remembered paying a visit to the Elland Works, many years ago, with a party of students under Mr. Cranfield, when that gentleman was lecturing on gas manufacture in Yorkshire. They were brought to Elland, he remembered, because Elland was known to be in the forefront, even in those days. He remembered seeing a conveyor which jerked the coal across. He believed it was of the Zimmer type. It would be interesting to know whether the reason of its non-mention in the paper was that it was found unsatisfactory.

The President drew attention to the merits of the De Brouwer conveyor chain, as compared with the telpher, for dealing with coke. Mr. Crowther, he noted, had not mentioned this type in the paper, but he thought the comparative merits of the two were well worth consideration in view of the large amount of coke which they had to transport at most gas-works. At Wakefield they had De Brouwer conveyors in use. They were installed in preference to telphers after careful consideration of costs; and on the Wakefield Works they found the running costs about 50 p.ct. less than those of telphers for the same tonnage. The De Brouwer conveyor, once set going, would carry on until it had delivered the run, whereas a telpher plant required an extra man to pick away the coke. De Brouwer conveyors were very low in maintenance costs; and comparing the conveyors at Wakefield with telpher plants at other works for similar duty, they found the maintenance costs were less, exclusive of labour charges which would have been involved had telpher conveying been in use.

Mr. F. Firth (Leeds, Junior Vice-President) said he had no doubt costs were largely a matter of local circumstances. It was evident that the De Brouwer was more suitable than a telpher conveyor on the Wakefield Works; but on another works the reverse might be the case. The telpher, he thought, was probably more flexible than the De Brouwer. This subject of conveying was difficult of discussion by Juniors, because they had not always in their possession figures of comparative working costs. Turning to the question of lubrication, Mr. Firth said he wondered why the gas industry so persistently used grease. Personally, he thought the use of grease was rather a mistake, because, before a grease became effective, there had to be a certain friction temperature. The railway companies were now using oil instead of grease; and he thought the same liquid lubricant might with advantage be substituted for grease on gas-works conveying plant.

Mr. F. J. Jackson (Sheffield) observed that, though Mr. Crowther had not mentioned particularly coal unloading devices, the meeting might be interested in the rotary tippler in use at Sheffield. It might not be so applicable to a small works as to a medium-sized works, but in the latter he thought it surpassed any other type. At Sheffield they could deal with anything up to 120 wagons in a working day; and he was sure the costs of unloading were appreciably decreased by this method. The costs, he agreed, rose a little sometimes, because of the wet conditions of much of the coal supplied, which necessitated the employment of extra labour; but even with that extra charge the costs were something less than a half-penny per ton of coal.

Mr. Currier (Leeds) thought Mr. Crowther might well have laid more stress on the matter of wearing straps on the races of the elevator. Engineers should always insist on these wearing straps being put in on the angle-iron races when the plant was being installed. The extra initial cost was small compared with the advantage of having this done before the plant began working. In regard to the rotary wagon tippler mentioned by Mr. Jackson, he (Mr. Currier) had had experience of this at Birmingham; and he entirely agreed with Mr. Jackson as to the cheap handling of coal by this method in a works of any magnitude. In the case he had had in mind, the clamping arrangement was hydraulic; and though they reduced the pressure, they damaged some of the wagons rather badly, and were put to the expense of repairs of wagons which belonged to people other than themselves. Afterwards they cut out the hydraulic arrangement, and put in a hand-screw for clamping.

The President, reverting to his previous mention of the De Brouwer conveyor, said that anybody thinking of installing this plant should note that the holding-down tee at the side of the conveyor in many cases was not made easily renewable by the contractors. It was a point they had come up against in the former De Brouwer conveyor they had at Wakefield, and for which they made provision when installing the new conveyor. Now tees were easily accessible when removing the chain. Mr. Chester said that at Wakefield they had in use all the types described by Mr. Crowther in his paper.

The Author's Reply.

Mr. Crowther, replying to the discussion, observed that Mr. Mortimer had expressed a preference for elevators which were not totally enclosed. This, of course, was largely a matter of opinion. The encased elevator had the advantage of preventing rust and corrosion. The Zimmer jigging conveyor at Elland, mentioned by Mr. Clegg, had been dismantled in 1921. It was very noisy in action, and maintenance costs had become high. The band conveyor had been installed instead, and, as mentioned by Mr. Bridge, had cost little in renewals since that time, and had proved a good investment. Mr. Crowther said he believed the De Brouwer conveyor, as mentioned by the President, was an excellent type, but he had had no opportunity of studying the handling costs of coke in a horizontal retort house. In answer to Mr. Firth's preference for oil instead of grease, Mr. Crowther said that grease was probably persistently used because it was good in preventing the entry of dust into the bearings —a matter of considerable importance when handling coke or other gritty materials. It had also been said, he believed, that the use of oil on a band conveyor had a bad effect on the belt. The tippler method for unloading coal, mentioned by Mr. Jackson, was an excellent one; but at Elland, though they were close to the railway, it was impossible, owing to peculiarities of the site, to have coal delivered into the works by means of railway wagons. All the coal came by water. They believed they had the best possible type of conveying plant for handling from barges. Mr. Crowther said he entirely agreed with Mr. Currier on the matter of having wearing straps fixed on all elevators and conveyors when they were being erected. It was bad practice to allow any angle-iron to become worn before fixing these straps.

Votes of Thanks.

Mr. J. W. Horwill (Bradford, Hon. Secretary), proposing a vote of thanks to Mr. Crowther for his paper, said it was a particular pleasure to do so because of the help Mr. Crowther had given him during the past session as Assistant Hon. Secretary.

Mr. H. E. Wilde (Bradford, Hon. Treasurer), seconding, said that Mr. Crowther had given a paper for which they would all look eagerly in the "Gas Journal," and subsequently in the Junior Associations' "Transactions."

Hearty thanks to the Directors of the Elland Gas Company and to Mr. Bridge, for the facilities for the meeting and the works visit, were accorded on the motion of Mr. F. Firth, seconded by Mr. Jackson.

Mr. Bridge, in replying on behalf of his Directors and himself, said it was always a pleasure to do anything he could to support the Yorkshire Junior Association, in which he felt a great pride and interest. The Chairman of the Board had especially asked him to give the meeting the good wishes of the Directors, and the assurance that the members of the Association would be welcome to look round the Elland plant at any time.

Mr. Bridge took advantage of the opportunity, before the party left the meeting room for the works, of describing the prospective new plant, with the aid of a large-scale drawing. Descriptions of the Elland-cum-Greetland Gas Company's Works appeared in the "Journal" for June 4, 1924, and March 27, 1927; and reference to the new scheme now under preparation was made in the "Journal" for May 16 last—p. 448.

FORTHCOMING ENGAGEMENTS.

June 2.—North of England Gas Managers' Association (Auxiliary Section).—Half-yearly meeting at the Gas Office, Grainger Street, Newcastle-on-Tyne, 2.30 p.m.

June 5.—Institution of Civil Engineers.—Conference for Gas, &c., Engineers. 10.30 a.m. to 1 o'clock.

June 9.—London and Southern District Junior Gas Association.—Visit to the works of the Tunbridge Wells Gas Company.

June 11.—Bute Lodge.—Emergency meeting to welcome the masonic members of The Institution of Gas Engineers.

July 4-5.—Association of Statutory Inspectors of Gas Meters.—Annual conference in Birmingham.

July 9-12.—Association of Public Lighting Engineers.—Annual meeting and conference at Sheffield.

The Institution of Gas Engineers.

All meetings take place in the Council Room at 28, Grosvenor Gardens, unless otherwise stated.

June 11.—Council meeting at the Park Hotel, Cardiff.

June 11.—Dinner to the Council, by invitation of the President, at the Park Hotel, Cardiff, Sir David Milne-Watson, guest of honour.

June 12.—Council meeting in the Cory Hall, Cardiff.

June 12-15.—Annual General Meeting at Cardiff.

June 14.—Council meeting in the Cory Hall, Cardiff, for the appointment of Committees for the year 1928-29.

July 10.—Gas Education Committee.

Oct. 9.—Gas Education Committee.

Nov. 13.—Executive Committee of Gas Education Committee.

Dec. 11.—Executive Committee of Gas Education Committee.

Fuel Conference, 1928.—Mr. M. W. Burt, the Joint General Secretary for the Secretaries of the Fuel Conference, 1928, which is to be held from Sept. 24 to Oct. 6, at the Imperial Institute, informs us that all applications for membership forms for the Conference should be addressed to: The Secretaries, Fuel Conference 1928, World Power Conference, 36, Kingsway, W.C. 2.

CHEMICAL INDUSTRY CONFERENCE.

May 11 to 15.

The Conference—see *ante*, p. 534—was resumed at the Institution of Civil Engineers on Tuesday, May 15, when Sir ERNEST RUTHERFORD, O.M., F.R.S., presided at the morning session.

SCIENTIFIC RESEARCH AS APPLIED TO INDUSTRY.

By Sir ALFRED MOND, Bart., M.P.

[EXTRACT.]

In an address on this subject, Sir Alfred Mond first referred to the suggestion that had been made by Lord Balfour that, though they in this country had always excelled in pure science, they had been somewhat laggard in applying science to practical purposes. This suggestion, he said, could be argued both ways as regards this country, and also as regards others. Science was not a national affair; it was a human affair, and at any given moment the scientists of one country might be ahead of those of other countries, or one country might be ahead in the matter of the application of science. It was satisfactory to know that there were brilliant scientific discoverers throughout the civilized world, and they in this country had had their share of the most eminent men of science the world had ever seen. It was, indeed, difficult to say, speaking generally, that one country was better or worse than another in the matter either of scientific discovery or of scientific application. In endeavouring to trace what had been done in this country in the application of science to industry, it was difficult to know at what period to begin. If he started with the time of Stephenson and Watt, could it be said that they had let slip the opportunity of developing their great discoveries, or that other countries had taken advantage of them before they did? Such an assertion could be proved historically to be incorrect. It might be said that Stephenson and Watt were not chemists; but it was becoming practically impossible to fix boundaries between the different sciences. Chemistry played a part in all industries, and chemists were necessarily required to control the operations.

Proceeding on these lines, Sir Alfred said it would be possible to produce a volume of eminent men in this country who had made great discoveries and whose discoveries had been applied. He could not help feeling that in making the remark which Lord Balfour did, his mind had been influenced by the fact that was dinned into our ears with monotonous insistence that Perkin discovered mauve and the Germans developed the aniline dye industry. Some people seemed to think that the beginning and end of the chemical industry was the aniline dye industry. Personally, he had been connected with the chemical industry all his life, but it was only a few years ago that he had had anything to do with aniline dyes; and he had no patience with the view of some people that the aniline dye industry was the beginning and end of the chemical industry simply because some eminent Germans—the value of whose services in the cause of invention and scientific development nobody wished to diminish—developed in Germany an industry which to a large extent remained neglected in their own country. It was not altogether fair to blame the British capitalist or the British inventor or the British chemist for the fact that the industry was not developed in this country. A careful examination of the patent laws as they used to exist would show the remarkable ingenuity not of the scientists, but of the "legalists" employed by their friends in Germany, who succeeded in tying up the industry in this country for many years in a way few people realized. It was not everybody who was prepared to enter into long and costly litigation with the powerful firms which were established on the Continent; and it was that which prevented anything in the way of development here. It was due to modern legislation, and the fact that the war forced the development of the aniline dye industry in this country, that progress had been made. There was not so much mystery about the aniline dye industry as so many people imagined, nor had our German friends any monopoly either of knowledge or of invention in this direction. In fact, British dyers and Scottish dyers had established a very sound industry; and he was glad to think that licences had been granted by British manufacturers of dyes even to the almighty people on the Continent.

Lord Balfour might rightly have complained of a certain backwardness not so much on the part of the British manufacturer, but of the British capitalist, to embark capital on what were ventures which, if successful, offered great prizes; but, if failures, meant total loss. That was one of the directions in which industry had suffered a good deal. He had been over some of the works of the I.G. in Germany, and seen their research laboratories, and he could not help being struck by the immense sums that were being spent upon throwing bread on the waters in many interesting directions, out of profits, and endeavouring to develop new ideas. The Germans worked on a scale in this matter which would make the chairmen of some companies here shudder with horror, and make finance directors tremble; but the I.G. had at its head a gentleman of ability and eminence, a technician who wisely used some of the large resources available in promoting the development of new ideas—he referred to Dr. Bosch.

That was one of the advantages of combination. People had criticized large amalgamations of capital and management. He himself was responsible for the formation of the largest amalgamation in the chemical industry. Arguments could be produced for and against such amalgamations, but there was one thing which must be admitted, and that was that a large organization combined more possible elements of talent in the technique of different processes, and also more experience; and it commanded more capital resources than a smaller enterprise, even the best managed, could hope to have. That was an important factor in a period when chemical plant had become so expensive that it was not a question of hundreds of thousands of pounds sterling, but perhaps of millions, to erect the delicate and complicated machinery necessary. If an organization was not prepared to spend hundreds of thousands of pounds in research, it was bound to fall behind other companies which were in that position. It was not that they had not in this country either the men or the material to carry out ideas or to create. He had seen leaders of industry, managers, and research workers in every country in the world, and had come in contact with them, and had had means of gauging their capacities; and he could say without any fear of contradiction that they had to-day in this country—and he believed they always had had—men of more ingenuity and more practical application of scientific principles to actual manufacture than were to be found in any other country in the world. Given the opportunity, problems found a solution in a simpler and more direct and better method than was the case in other countries, where there was long and painstaking mass research.

There was a good deal of nonsense talked about research. Some people seemed to imagine that research workers could be ordered like ordering a suit of clothes, but the inventor was born, not made. It was impossible to take people and say "invent something," any more than a person could be told to paint a picture or do some sculpture; and the inventor was not necessarily to be found in any particular organization. There were two striking instances in recent times. One was the father of the modern synthetic nitrogen industry, Haber. He was not attached to any organization. The other was Bergius, of Heidelberg, who had done so much work on the hydrogenation of coal. In both these instances the work was brought to a certain stage of perfection by men not in touch with any organization; and it was possible that neither would have succeeded in bringing his inventions to the commercial stage unless his ideas had been taken up by the technical staffs of a big enterprise, and developed from a brilliant thought into the practical reality. It was in that direction that there was an enormous field. They were short, and he was afraid they would remain short for some time, of the real first-class brains that were required and were being looked for every day by his own organization to help to develop and carry out new problems. His organization was trying to break down the border line of industrial research and works management. He was sure that as long as the research worker was kept in a watertight compartment somewhere, and the works manager—of an entirely different type—was kept somewhere else, and they both treated each other as not knowing much, it would be the greatest stoppage to the real introduction of scientific principles into works practice. The men on both sides must intermingle and exchange. The research worker must understand the works problems, and the men in the works must understand the difficulties of research. In his own organization they were considering how to combine some of their research staff with the university staffs. To that end a Council of Research had been established in his Company, of which he himself was Chairman; and this Council of Research was assisted by the co-operation of a number of leading scientists in this country, with the object of pointing out what future developments of science and industry were likely.

Another matter of vital importance was the liquefaction of coal. This was beginning to be a practical technical proposition. He did not suggest that in the near future all the petroleum wells of the world would cease to flow, but the petroleum wells were not inexhaustible, whereas the coalfields of the world were very much more extensive; and the work upon the liquefaction of coal which was being done opened up one of the most interesting chapters. Summing up, Sir Alfred Mond said it seemed to him that chemical industry at the present time was more far-reaching and extensive and interesting than it had been at any period in its history.

PURIFIER COVER LIFTING LUGS.

By S. M. MILBOURNE, A.M.I.Struct.E.

The cover of a dry lute purifier is practically a plain flat surface, and in this respect differs very materially from the old form of water-luted purifier cover, where the depth of side sheeting, stiffened with a bottom curb of angle or tee iron, effectively prevented any undue deflection of the cover when raised, travelled, and lowered.

When designing steel covers for dry luted purifiers, it is desirable to place the lifting lugs in such positions that the resulting deflection when the cover is lifted is reduced to a minimum. This not only gives additional strength to the cover by reducing the bending moment, but guards against the possibility of the rubber jointing being ovestrained.

If the lifting lugs A.A. are placed too close to one another, it is obvious that when the cover is lifted deflection will take place in such a manner that the centre of the cover rises, while the cantilever ends fall, as shown diagrammatically in fig. 1.

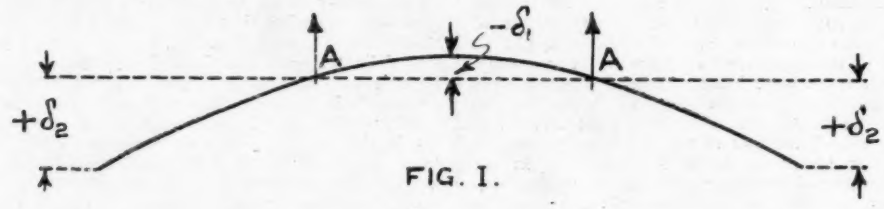

FIG. I.

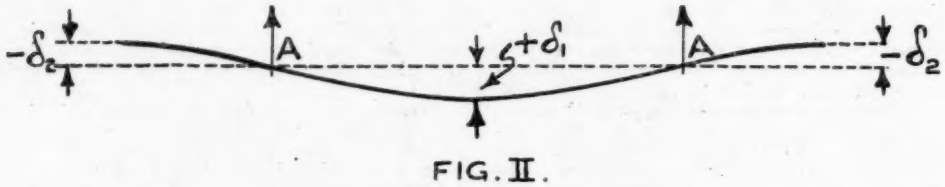

FIG. II.

Where δ_1 = deflection of cover between the lugs, and
δ_2 = deflection of cover at ends,

the *minus* sign denotes negative deflection and the *plus* sign positive deflection, relative to the points of support.

If, however, the lugs are placed too far apart, then the elastic line assumed by the cover when lifted may be represented diagrammatically as in fig. 2; the algebraic signs having the same significance as before.

Now it will readily be understood that if the lugs be moved further apart from the positions indicated in fig. 1, a point will be reached when the resulting deflection at the centre of the cover will be reduced to zero. When this takes place, the deflection δ_2 will also have diminished in magnitude, but will remain positive in sign. This condition is illustrated in fig. 3.

If the lugs are now moved still further apart, the central deflection δ_1 will assume a positive value, while the cantilever deflection δ_2 will continue to diminish, but will remain positive, as shown in fig. 4.

From the law of symmetry, it therefore follows that when the central positive deflection δ_1 = the maximum positive cantilever deflection δ_2, the condition of maximum stiffness has been reached. Therefore, if the lugs A.A. be arranged in these positions, the least possible amount of deflection will result when the cover is lifted.

The foregoing remarks apply to the positions of the lifting lugs on the transverse as well as the longitudinal axis of the cover. In the majority of cases, however, where the cover is narrow in comparison to its length, it is only necessary to carry out the investigation for the lug positions on the longitudinal axis.

The most favourable position of the lifting lugs may be determined by integration of the bending-moment functions occurring between the lugs and on the ends of the cover, equating the derivatives in order to obtain the common deflection value.

It is first necessary to draw out the loading diagram for the proposed cover on whichever axis it is required to investigate the lug positions. The sheeting and other members such as rafters and curbs, which run in the same direction as the axis, are treated as distributed loads, while the curbs and other transverse members are treated as concentrated loads. Fig. 5 illustrates a typical example of a purifier cover having five lines of transverse members *pp*, *qq*, and *r*, and one central row of longitudinal members.

For constructional reasons, it is necessary to arrange the lifting points immediately over the rafters, so that the bolts securing the lugs may obtain a firm grip on the cover.

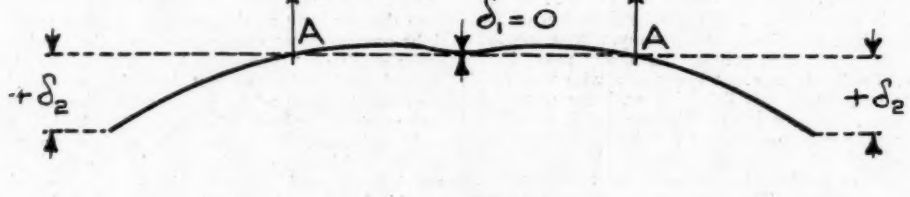

FIG. III.

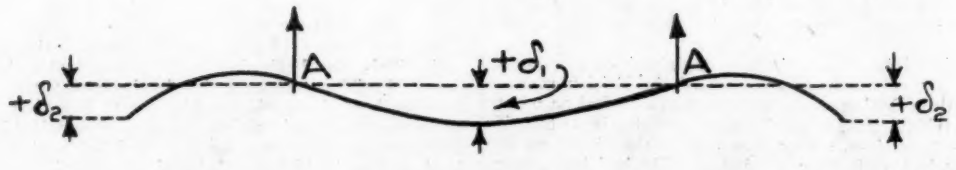

FIG. IV.

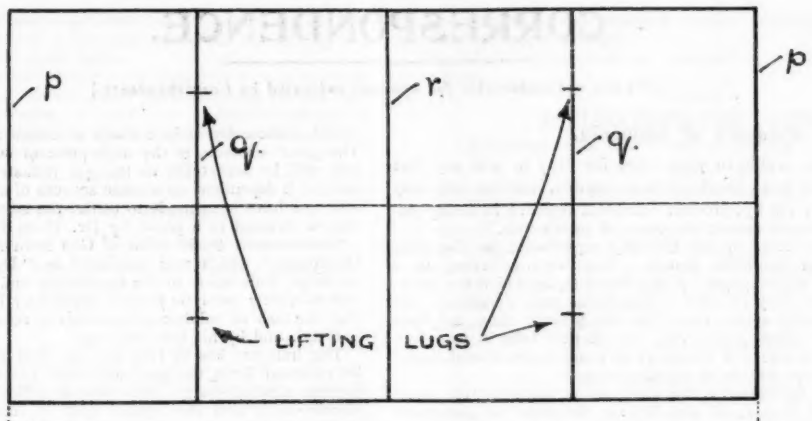

FIG. V.

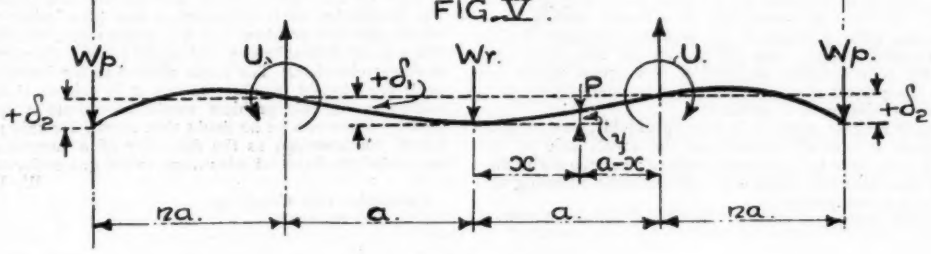

FIG. VI.

When deciding upon the transverse members to which the lugs are to be secured, it should be borne in mind that the positions of the lugs usually occur at centres from one-half to two-thirds the length of the cover. In the case under investigation, it therefore follows that the lugs will be secured to rafters (*rr*). But since the cover is supported at these points, the weights of the lug-rafters are not included in the load diagram.

In fig. 6, let P be any point on the longitudinal axis of the cover between the lugs and at a distance (x) from the centre of the cover. Then the bending moment on the centre span will be represented by the expression—

$$\left\{\frac{Wr}{2}(a-x)+\frac{w}{2}(a^2-x^2)\right\}-U \quad \ldots\ldots\ldots \quad (1)$$

Where Wr = weight of member (*r*), see fig. 5.
w = distributed load per unit length of cover, and
U = counter moments at points A.A. due to the weight of the overhanging ends of the cover (na).

Substituting U in terms of (Wp), (w), and (na) where n = some fraction of (a) then

$$U = w(na)^2/2 + Wp.na. \quad \ldots\ldots\ldots\ldots \quad (2)$$

Inserting the value of U in equation (1), and applying the usual mathematical relationships to determine the second derivative, the following is obtained :

$$EI\frac{d^2y}{dx^2} = \left\{\frac{Wr}{2}(a-x)+\frac{w}{2}(a^2-x^2)\right\}-\left\{Wp.na.+w(na)^2/2\right\}$$

On integrating once

$$EI\frac{dy}{dx} = \left\{\frac{Wr}{2}\left(ax-\frac{x^2}{2}\right)+\frac{w}{2}\left(a^2x-\frac{x^3}{3}\right)\right\}- \left\{Wp.na.x+w(na.)^2x/2\right\}+C. \quad \ldots\ldots \quad (3)$$

(but at the centre of the cover where $x = o$, $dy/dx = o$; therefore C = o).

This gives the slope at any point (P) between the lugs distance (x) from the centre of the cover.

Integrating again

$$EIy = \left\{\frac{Wr}{2}\left(\frac{ax^2}{2}-\frac{x^3}{6}\right)+\frac{w}{2}\left(\frac{a^2x^2}{2}-\frac{x^4}{12}\right)\right\}- \left\{Wp.na.\frac{x^2}{2}+w(na)^2\frac{x^2}{4}\right\}+C_1 \quad \ldots\ldots \quad (4)$$

but at the centre of the cover where $x = o$, $y = o$.
Therefore $C_1 = o$.
Then

$$y = \frac{1}{EI}\left\{\frac{Wr}{2}\left(\frac{ax^2}{2}-\frac{x^3}{6}\right)+\frac{w}{2}\left(\frac{a^2x^2}{2}-\frac{x^4}{12}\right)\right\}- \frac{1}{EI}\left\{\frac{Wp.nax^2}{2}+\frac{wn^2a^2x^2}{4}\right\} \quad \ldots\ldots\ldots \quad (5)$$

and where $x = a$ in the above equation $y = \delta_1$
Then

$$\delta_1 = \frac{4Wr.a^3-12Wp.na^3+5wa^4-6wn^2a^4}{24EI} \quad \ldots\ldots \quad (6)$$

The deflection on the ends of the covers may be found from the equation giving the deflection of a simple cantilever and adding the slope occurring at the lugs A.A. (algebraically).

Let δ_2 = deflection of cantilever end of cover.

$$\text{Then } \delta_2 = \frac{Wp(na)^3}{3EI}+\frac{w(na)^4}{8EI}+na\frac{dy}{dx},$$

and substituting the value given by equation (3) when $x = a$ for dy/dx in the above expression, the following is obtained :

$$\delta_2 = \frac{Wp(na)^3}{3EI}+\frac{w(na)^4}{8EI}-\frac{na}{EI}\left\{\left(\frac{Wra^2}{4}+\frac{wa^3}{3}\right)-\left(Wp.na^2+\frac{wn^2a^3}{2}\right)\right\} \quad (7)$$

If $\delta_1 = \delta_2$,
Then

$$\frac{4Wr.a^3-12Wp.na^3+5wa^4-6wn^2a^4}{24EI} = \frac{Wp(na)^3}{3EI}+\frac{w(na)^4}{8EI}-\frac{na}{EI}\left\{\left(\frac{Wr.a^2}{4}+\frac{wa^3}{3}\right)-\left(Wp.na^2+\frac{wn^2a^3}{2}\right)\right\}$$

Reducing the above equation by dividing throughout by $\frac{1}{24EI}$, writing $a = 1$, and then equating to zero, the following is obtained :

$$8Wp.n^3+24Wp.n^2+12Wp.n-6Wr.n-4Wr.+3wn^4+12wn^3+6wn^2-8wn-5w = o$$

which reduces to

$$(3w)n^4+(8Wp+12w)n^3+(24Wp.+6w)n^2+(12Wp.-6Wr-8w)n-4Wr-5w = o \quad \ldots\ldots\ldots \quad (8)$$

Substituting values for (Wr) (Wp) and (w) in equation (8) and solving for the real value of (n) gives the correct distance from the end of the cover in which the lugs should be placed.

Let D = distance of lugs apart and L = total length of cover.
Then

$$D = \frac{L}{(1+n)} \quad \ldots\ldots\ldots\ldots \quad (9)$$

The foregoing investigation applies only to purifier covers in which there are three rows of stiffening members. But by suitable modification of the terms representing the bending moments in equations (1) and (2), and proceeding in a similar manner to that described above, the lug positions may be ascertained for covers having any number of stiffening members.

Murdoch Lodge, No. 3480.

The regular May Meeting of the Murdoch Lodge was held in the Connaught Temple of the Imperial Hotel, Birmingham. The W.M., W.Bro. W. A. Twine, presided, with Bro. R. J. Meiklejohn as S.W. and Bro. J. Brettle as J.W. After the usual preliminary business, Mr. Geoffrey Arthur Peppercorn, who had been previously proposed by Bro. Sir A. M. Duckham, K.C.B., and seconded by W.Bro. F. Vale, P.P.S.G.W. (Worcs.), was initiated. After the dinner, a very pleasant musical evening was spent, the chief items being rendered by visiting brethren.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Recovery of Ammonia.

Sir,—In a leading article in your issue for May 9, you say that "Synthetic Ammonia has caused prices to tumble, and the only way to get better returns for bye-product ammonia appears to be by doing whatever possible to reduce the costs of production."

You then go on to refer to the difficulty experienced in disposing of the effluent from ammonia plants. You were referring to a very interesting and useful paper by Mr. Sensicle, in which the adoption of the direct recovery method in gas-works was advocated. In his paper, Mr. Sensicle stated that "at the present time, sulphate of ammonia is only worth £10 a ton, and further falls in price are indicated, so that the sale and transport of crude ammoniacal liquor may soon become unprofitable to its producers."

Mr. Sensicle has understated the case, as is apparent on reference to the Annual Report of the British Sulphate of Ammonia Federation, where the average price f.o.r. at makers' works for ordinary quality, 20·4 p.ct. nitrogen, for the year ended May 31, 1927, was £8 8s. 7d. The cost of production of ordinary quality on a plant producing 200 tons of sulphate per annum, averaged during a period of six months in 1927, was £8 9s. 3d. per ton. It should be stated that this sum included the cost of fuel—items which are often charged to the general works account, thereby enabling a return from ammonia to be shown as a profit.

The production of neutral sulphate is more profitable, and even at present prices returns a small revenue on the credit side of the accounts after all costs have been properly debited; but the dwindling return from this once valuable residual is very seriously affecting the cost of producing gas everywhere.

It seems doubtful, however, whether the direct recovery method would sufficiently reduce costs to make any appreciable difference. The great obstacle is the high price of sulphuric acid; and no process will be acceptable to the gas industry, in the long run, which renders it dependent on outside sources of supply. From time to time attempts have been made to utilize the sulphur in the gas; and attention is directed to a paper by Dr. Hans Bahr, of Dortmund, on the "Simultaneous Purification of Gas from Ammonia and Sulphuretted Hydrogen," which was published in "Das Gas- und Wasserfach" recently. This refers to the Burkheiser and the Walter Feld processes, also to a new catalytic process devised by Bahr, as to which he states that the cost of sulphur and ammonia recovery by the older methods is 6·24d. and by his method 3·84d.

The industry has to face the fact that ammonia and sulphur must be removed from the gas, and that there are several objections to present methods—*e.g.*, the effluent difficulty, the high cost of sulphuric acid, and the capital cost of, and space occupied by, dry purifiers. Previous attempts at liquid purification have failed, but it may be that some slight modification will render it successful. The Institution of Gas Engineers has been asked to undertake research into this problem, but it is evident that an investigation would cost a great deal of money and would require the services of a number of expert chemists. The funds allotted to the Institution for research work are already insufficient, and it is evident that a thorough investigation of this problem would necessitate a special appeal for funds. There can be no doubt that money for this purpose would be readily forthcoming, as the discovery of a successful process would be of obvious financial advantage to all gas undertakings.

W. W. Townsend.

Colchester Gas Company,
May 19, 1928.

REGISTER OF PATENTS.

Valves and Cocks.—No. 288,403.

Dine, J. H., and Proctor, L. J., both of Birmingham.

No. 4318; Feb. 16, 1927.

The patentees point out that the space allowed for gas meters in modern houses is frequently very restricted, and allows scarcely enough room for a stop valve or cock of ordinary construction to be fitted between the supply pipe and the meter, while in other instances the working of such valves is almost impossible, owing to lack of space for the handle or key to be turned.

The object of the present invention is to improve the construction of valves and cocks, and to provide a valve or cock which is compact and of comparatively smaller dimensions for a given size of passage, while its particular construction enables it to be employed in more restricted and inaccessible spaces than those at present in use.

The proposed valve or cock comprises in combination a tubular body formed internally with a conical apertured wall or seating axially projecting within the tubular body, and a rotatable apertured plug of conical form working against this seating, with one or more radial pins engaging a blind hole or holes in the outer periphery of the conical plug for actuating the plug from an outside member. Circumferential slots are formed in the body of the valve for the passage therethrough of the pin which engages the blind holes in the conical plug.

Water Gas Manufacture.—No. 288,426.

Misch, O., of Frankfurt-am-Main.

No. 7776; March 21, 1927.

The patentee claims a process for generating gas from bituminous fuels by distilling the fuel in a retort heated at its lower end, and feeding the distilled fuel from the retort by gravity into a water gas producer disposed beneath the retort, wherein the retort is heated externally at its lower end either by means of a compressed air burner provided with baffles for the purpose of producing eddying or turbulence of the water gas and compressed air consumed thereby, or by means of oil burners, coal dust burners, or similar means adapted to produce an intensive local heating such that the contents of the lower portion of the retort are brought to a temperature of more than 700° C., while the temperature of the contents of the retort above this point decreases towards the charging end of the retort.

Another feature claimed is the introduction into the distillation retort of oil or tar just above the hot lower zone with the aid of pipes extending preferably in the direction of the longitudinal axis of the retort, for producing oil gas besides the illuminating gas, from a small auxiliary reservoir which is connected through the intermediary of two shutting-off elements to the main oil reservoir on the one hand and, on the other hand, to a steam pipe in order to force into the incandescent coke layer portions of oil or tar under pressure.

A short intermediate period is arranged between the blowing time with air and the gasifying time with steam, during which period only a little steam, for scavenging nitrogen and carbon dioxide, is supplied to the producer.

As regards the apparatus, which is fully described and illustrated, the feature is claimed that the retort or the retorts is or are supported only at the lower end, the upper end being held in the correct position by means of elastic sheet-iron holders or the like.

Water Gas Manufacture.—No. 288,797.

Bowater, N. J., of Victoria Street, S.W. 1.

No. 7438; March 17, 1927.

This invention consists in causing carbonaceous fuel to fall in a finely pulverized form through a reaction chamber in contact with the steam required for the water gas reaction, and supplying the heat required by the reaction to the pulverized fuel from the heat-radiating surface arranged within the reaction chamber.

In order to permit the reaction to be completed in the minimum possible time, the heat-radiating surface is preferably raised to the maximum temperature it is capable of withstanding; and in order to avoid loss of heat from the apparatus, by radiation and convection, the source of heat is preferably centrally situated in the reaction chamber, and the latter is surrounded by heat-insulating material.

The heat-radiating surface can be heated in any suitable manner—for example, by means of hot gases or by the combustion of an independent supply of any suitable fuel or electrically. In one embodiment of the invention, the surface can be in the form of a hollow cylinder, or other suitable shape, of a refractory material, and may be heated by the combustion in the interior thereof of liquid, gaseous, or pulverized fuel. The air supplied to the element, as well as the combustible material itself, may be heated prior to combustion by means of the sensible heat of the products of combustion leaving the apparatus. Alternatively, this heat may be utilized for the purpose of raising steam for use in the process and/or for superheating such steam prior to its admission to the reaction chamber.

The duration of contact may be increased by increasing the cross-section of the reaction chamber in an upward direction, thereby decreasing the upward velocity of the steam so that the velocity of the falling fuel particles gradually decreases as they descend until the reaction is completed and the fuel particles reach the bottom of the reaction chamber where the ash is withdrawn continuously or periodically in the form of slag, or, if the ash be highly refractory, in the form of a powder.

The reaction chamber may contain more than one heat-radiating surface; and a number of the reaction chambers may be suitably grouped to form a battery in order to increase the production of water gas and to diminish heat losses.

A drawing accompanies the detailed description.

Carbonizing Plant.—No. 289,123.

Broadhead, R. W., of Huddersfield.

No. 1326; Jan. 17, 1927.

This invention is particularly applicable for use in connection with horizontal retort settings; the chief object being to introduce an improved construction and arrangement which will prevent all dust and foreign matter contained in the producer gas from entering the setting and exerting a fluxing tendency on the brickwork of the latter.

According to the invention the producer is built separate from the bench with a clear spacing or passage between the producer and the setting but in an adjacent position, so that the incandescent coke can be transferred from the retorts to the producer without a material loss of heat; and it is provided with means for extracting foreign

matter contained in the producer gas before such gas enters the setting, the extractor constituting a separate unit from the setting and connected with it by one or more ducts.

The producer may be installed within a shed which may be built on to the wall of the retort house; and the extracting means may comprise an expansion chamber or whirl, or a mechanical device such as a cyclone, the dust-free gas passing along a suitable insulated duct or ducts to the regenerator.

Gas Cookers.—No. 289,351.

MELLERSH-JACKSON, L., of Chancery Lane, W.C. 2.

(A communication from the Standard Gas Equipment Corporation, of New York.)

No. 28,640; Oct. 27, 1927.

This invention seeks to provide an improved type of smooth-top gas range. It comprises a closed cooking top, a burner plate supported below said top and forming in conjunction therewith a shallow unobstructed heat generating chamber having an outlet for the products of combustion, a plurality of bunsen burners each formed with a series of flame ports and located below the burner plate exteriorly of the heating chamber and also removable independently of said plate and of each other, and groups of secondary air openings formed in the burner plate one above each burner and arranged so that they act as ejector throat openings while the flame ports act as ejector nozzles.

The above combination constitutes the chief claim; a further feature being that the burners are detachably suspended from the burner plate by interlocking parts arranged partly upon the burners and partly upon the burner plate so that the burners are independently engaged and disengaged by a bodily movement thereof in a plane parallel with the burner plate.

The heat generating chamber has vents throughout the length which feed the products of combustion from the chamber into a flue having a base wide enough to cover all the said vents, and the walls curved upwardly and inwardly and terminating in a parallel portion forming a nozzle-like flue operating to prevent back pressure in the heating chamber and ensuring proper ventilation thereof, without creating excessive draught.

The whole arrangement is described in detail and made clear by drawings.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for May 9.]

Nos. 12,555—13,347.

BAUMHOR, A.—"Apparatus for fractional distillation of tar." No. 12,664.

CAMPKIN, G.—"Gas or electric cookers, stoves, &c." No. 13,102.

CHANDLER, D.—"Control devices for gas valves." No. 13,297.

DOCKING, A.—"Heating gases." No. 12,990.

DOWSON & MASON GAS PLANT COMPANY, LTD.—"Gas fired distillation muffles." No. 13,258.

ELSTERMANN, O.—See Baumhör, A. No. 12,664.

FISCHER, F.—"Purifying gases from sulphuretted hydrogen." No. 12,670.

HELPS, A. M.—"Gas manufacture." No. 12,586.

HOXLEY, H. W.—See Chandler, D. No. 13,297.

MCROBBIE, W.—"Gas meter diaphragm clamping rings." No. 12,878.

PATON, J.—See Dowson & Mason Gas Plant Company, Ltd. No. 13,258.

RITCHIE, HART, & Co., LTD.—See Docking, A. No. 12,990.

SENSICLE, L. H.—"Process for recovery of ammonia from gas." No. 12,721.

SMITH, J. H.—"Electric ignition apparatus for incandescent gas burners." No. 13,296.

SOUTH METROPOLITAN GAS COMPANY.—See Smith, J. H. No. 13,296.

SOUTH METROPOLITAN GAS COMPANY.—See Chandler, D. No. 13,297.

WARWICK, G. N.—See Campkin, G. No. 13,102.

WHEELER, R. V.—"Heat treatment of carbonaceous materials." No. 12,946.

WOODALL-DUCKHAM (1920), LTD.—"Charging furnaces." No. 13,319.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Bournemouth Gas and Water and Tottenham and District Gas Bills: Reported, with amendments; read the third time, and passed; sent to the Commons.

Windermere Gas and Water Bill: Brought from the Commons; read the first time; and referred to the Examiners.

Dursley, and Mablethorpe and Sutton Gas Orders: Approved.

Hinckley, Southend-on-Sea and District, and Weston-super-Mare Gas Orders: Referred to Special Orders Committee.

HOUSE OF COMMONS.

Progress of Bills.

York Town and Blackwater Gas and Electricity Bill: Read a second time, and committed.

Bournemouth Gas and Water and Tottenham and District Gas Bills: Read the first time, and referred to the Examiners.

Dursley, and Mablethorpe and Sutton Gas Orders: Approved.

Hinckley, Southend-on-Sea and District, and Weston-super-Mare Gas Orders: Copies presented.

Oil Extraction.

Replying, on May 15, to Mr. Shinwell, Commodore KING stated that research into the nature of the tars derived from coal by low-temperature carbonization and the methods of refining them was in progress at the Fuel Research Station and the Chemical Research Laboratory of the Department of Scientific and Industrial Research; but the provision of commercial facilities for refining crude oil was not for the Government to undertake. Such facilities existed in many gas-works and tar distilleries. He was not aware that any appreciable quantity of crude oil derived from low-temperature processes was being wasted.

Mr. WHITELEY, on May 22, asked the Secretary for Mines whether he could give the largest quantity of oil taken from British coal by any British plant since 1918; and (2) whether he could give the average oil content of British coal per ton, and the greatest amount of such content that had been extracted per ton of coal.

Commodore KING said that oil, as such, did not exist in coal, but the coal substances could be partially converted into oil by a variety of carbonization and hydrogenation processes. The average amount of oil that could be produced from British coals by low-temperature carbonization was usually taken at 15 gallons per ton. This figure was considerably exceeded when coal of special quality was used. For instance, over 50 gallons per ton had been obtained from a cannel coal of which, however, there were only small quantities available. By the addition of hydrogen to the coal, under the Bergius process, the yield from a suitable coal might even amount to 130 gallons per ton.

Coal Distillation.

Sir R. THOMAS asked the Secretary for Mines whether the Department of Scientific and Industrial Research had published any general and non-technical guide to all the existing processes of coal distillation; and, if not, would he consider the desirability of issuing one short enough to enable revised editions to be published at frequent intervals.

Commodore KING stated that no publication of the nature suggested was issued by the Department of Scientific and Industrial Research, nor did the Department think that it would be practicable or desirable for them to prepare and issue such a document.

THE RIGHT TO DIG UP PUBLIC ROADS.

In the House of Lords on May 17, Lord Montagu of Beaulieu moved a motion relating to the rights of undertakers to dig up public roads, as recorded in the "JOURNAL" for May 9 (p. 400). A summary of the speech from the "Official Debates" is given below.

Lord MONTAGU OF BEAULIEU said that it was about three years ago that he called attention to this question, and then he referred to the fact that the London Traffic Act, 1923, had done something, at any rate in the London area, to remedy the difficulty of the road authorities in resisting the constant disturbance of the roads. Since that time the County Council Associations had made efforts to get something done. They called a conference, and they approached various representatives of gas, water, and electricity companies, in order that some arrangement might be arrived at; but so far nothing had been agreed.

In the London area, it was true, streets could not be broken up unless notice was given to the Ministry of Transport in regard to certain areas; but, notwithstanding this fact, London was still subject to constant interruption in its traffic through the disturbance of its streets. The powers of undertakers were derived from a comparatively ancient Act of Parliament. In 1847, the Gas-Works Clauses Act and the Waterworks Clauses Act were passed. This was at a time when the railways had taken most of the traffic off the main roads, and when there was really no congestion in their cities. In those days roads consisted mainly of gravel, and even so late as thirty years ago they were mainly of macadam. To-day roads were of entirely different structure. They were in many cases massive engineering structures. To break up these roads nowadays was quite a different matter as regards the expense of breaking them up, and repairing and maintaining them.

Lord Montagu of Beaulieu then gave instances of streets being broken up in London, and passed on to particulars relating to the counties obtained from information he had received from various surveyors. In Poole, he said, a road was closed to traffic for several months while it was being reconstructed, and then within a few months of being re-opened, it was again cut off—first for gas and then for electric light. From Kent he had the same sort of report.

Lord Montagu of Beaulieu said his proposal would be that first of all they must repeal the Gas-Works and Waterworks Acts, 1847, and extend the special provision of the London Traffic Act. It would also be a good plan to make the period of non-disturbance two years instead of one. His second recommendation would be that in all the new roads the undertakers should duplicate essential services by laying them at each side of the street. Even existing services should be duplicated within a period (say) of five years. Coming to the rather more difficult question of what was to be done on big estates like Piccadilly, Oxford Street, Regent Street, and so on, he said that he thought they would have to begin as soon as possible the construction of subways or tunnels, under or near main streets or highways, for the accommodation of these essential services, in order to avoid constant interruption of service and delay of traffic. His fourth recommendation would be to make some charge to all undertakers for the use of wayleaves under highways, and when they used the verge or edge of highways. In regard to the whole of this question the interesting point arose that the road user was not officially represented. On the other hand, gas and water companies were very well organized. Their parliamentary influence was considerable, and they were entrenched behind a series of Acts and precedents.

Earl Russell, in the course of his speech, remarked that he doubted whether conferences by the Ministry of Transport, in which the undertakers were the dominant feature, were ever likely to solve the question. He thought that they would have to disregard the undertakers' point of view. After all, if an ultimate expense really was put upon the undertakers, it would mean for the time being some slight increase in the price of gas or electricity, which he feared would have to be borne in the general interest. They could not have this important question dominated any longer by the views of undertakers. He would suggest the setting up of a Joint Select Committee to look into the question. The problem was far from a simple one; and they could not come to any conclusion as to what might be the best method of dealing with the matter without taking a great deal of evidence.

The Earl of Onslow, replying, stated that Lord Montagu based his case against the undertakers on the fact that they made use of the Act of 1847. He (the Earl of Onslow) thought the private undertakers were companies with Private Acts of their own which incorporated sections of the Act of 1847. As a matter of strict accuracy, they worked under Private Acts rather than under the Act of 1847.

Earl Russell: That is true. None the less, the general idea of the legislation was settled in 1847.

The Earl of Onslow, continuing, agreed, but said there were Private Acts. There were one or two very small gas companies which were not statutory, and who, as a matter of fact, put their mains under the road. These people had the right to get at their mains by breaking up the road whenever it was necessary. It was obvious that some such right must exist. There must be some means by which the undertaker was able to get at the mains and put the service straight; otherwise consumers would experience no inconsiderable difficulty.

Coming to the various "provisions" which regulated these rights of the undertakers, the Earl of Onslow pointed out that the state of affairs in London differed materially from that in other parts of the country. In London practically all the services were owned by statutory undertakings and the Postmaster-General. The local authorities themselves did not carry out gas, water, and electric light undertakings; but in many other towns in England the local authorities were large dealers in gas, water, and electric light. If the local authority was the controller of the various services, it was much easier to regulate the nuisance than was the case when there were several authorities—one for gas, one for electricity, one for water, and the Postmaster-General. Another difference between London and the large towns was that there was an Act in London dealing with the matter, and which made special provision for digging up the streets.

Dealing with towns outside London, the Earl of Onslow mentioned that the corporations and the district councils were often undertakers of gas, water, and electric light, as well as being the highway and sewage authorities. With control in one hand, it was much easier to secure co-operation. Generally speaking, he thought there was close co-operation between the various interests in most of the big towns of England, and that every effort was made to avoid inconvenience.

Regarding the new arterial roads like the Great West Road and a number of by-pass roads that had been constructed not only around London, but over the whole country, the Earl of Onslow said that there were very few houses built along these roads at present; but as time went on the frontages of these roads would be taken up, and towns would spring up all round. These towns would, of course, need gas and other public services. The practice of allowing 100 ft. between fences gave room to put mains on both sides of the road, so that the roadway would not be disturbed. Of course, there was a disadvantage in having two sets of mains, but otherwise trenches would have to be cut across the road. It might be a little more expensive; but it was more convenient and better for the roads. It was possible, too, though perhaps a difficult proposal, to lay mains at the back of houses instead of along the roads.

The provision of subways in Kingsway and Aldwych for carrying mains was referred to by the Earl of Onslow; and he pointed out that it was only partially satisfactory, because the number of mains required soon exceeded the space provided. The enormous cost was the real reason why it was difficult to provide subways, especially in crowded areas.

The suggestion had been made that further payments should be made by undertakers for the easements which they had for their mains under the roads. It was not quite correct to say that they were allowed to do this free of charge. They did not pay for the easement, but they did pay rates. He could not give the total contributed to the rates made by the undertakers, because assessments varied in different areas. The contribution was, however, a large one. If a private company were made to pay rent for its easements, it would pass on the payment to the consumer, who was also the ratepayer; so what he would gain in the fall of rates, he would lose in having to pay extra for gas and water.

The Government, added the Earl of Onslow, were fully aware of the nuisance caused by taking up the roads, and were ready to do anything in their power to limit it, and would welcome any suggested remedy.

The motion was, by leave, withdrawn.

SOUTH SUBURBAN AND DOVER COMPANIES' BILLS.

THE PRINCIPLE OF THE BASIC PRICE AND BASIC DIVIDEND.

Joint Committee of Both Houses—Thursday, May 17.

(*Before Lord* Chalmers (*Chairman*), *Lord* Bertie of Thame, *Sir* F. Watson, *Major* Ropner, *Lord* Henley, *Lord* Charnwood, *Earl* De La Warr, *Mr.* Maitland, *Mr.* Wallhead, and *Mr.* E. Brown.)

When the proceedings were resumed on May 17, the Chairman said the Committee was in some difficulty as to whether the Gas Companies which had petitioned against alterations to the South Suburban Company's Bill had any *locus standi*.

The Hon. Evan Charteris, K.C. (Counsel for the Commercial Gas Company) said the procedure was that such petitions were not heard until the Committee had given some indication of its intention to alter the Bill in such a manner as would affect their interests. Then they would be entitled to be heard.

The Chairman said Counsel would not consider that the Committee in any way recognized a *locus standi* in anticipation of a decision it might reach.

Counsel replied that he anticipated nothing.

The Chairman said the *status quo* would be preserved. With a view to assisting to shorten the proceedings, he said the Committee was very satisfied indeed as to the high repute of the South Metropolitan Gas Company, and did not wish to enter into details about its working.

Mr. Abady (for the South Suburban Company) said this would enable the evidence of Dr. Carpenter to be shortened. Dr. Carpenter was unwell, and it was fortunate that he was able to attend at all.

The Chairman intimated that the Committee wanted to know why the South Suburban Company wanted to change from the sliding-scale to the basic price principle, and what advantage it would derive from the change.

Dr. *Carpenter* said the Company wished to be able to pay a dividend which would keep their stock at such a price as would ensure a free flow of capital, which was to everybody's advantage. Under the basic price system there was a very strong inducement to keep capital charges low, and there was a strong inducement to increase business.

Lord Bertie asked whether the stocks of the two Companies rose and fell very much at normal times.

Witness replied that the South Metropolitan Company's stock was fairly regular; the South Suburban Company's stock was also fairly steady. Developing further this point, that under the sliding-scale there was less inducement than under the basic price system to increase sales, he referred to a discussion he had had with two managers of gas undertakings working under the sliding-scale. One of these managers had asked what advantage was to be gained by large increases of business. He had pointed out that fresh stock would have to be issued under the auction clauses, and would not be of advantage to the present shareholders, and that new consumers would be difficult to provide for because of the cost of labour and materials. If he could secure a little increase in consumption, that was all that was wanted. That, said Dr. Carpenter, was one of the defects of the sliding-scale. It was conceivable that a company might be able to increase sales by 50 p.ct., but it might not be possible to decrease the price of gas. Under the sliding-scale system the shareholders of that company could not obtain a penny more in dividend. Under the basic system, however, they could, because the pool from which extra dividends were derived would be larger than formerly by reason of the larger consumption of gas. The gas companies were doing a great work by improving the conditions of life, and their work in increasing the supply was worthy of the fullest possible encouragement.

A table, prepared by Sir William Plender, was produced to illustrate what would have been the result of operating the basic system in the case of the South Suburban Company in the years from 1922 to 1927. In 1922 and 1923 there would have been no consumers' benefit, because gas was not sold below 11d. per therm. In 1924 the price was less than 11d.; and by multiplying the amount of the decrease in price per therm by the sales of gas, it was shown that the consumers' benefit would have been £86,529. In 1925 the consumers' benefit would have been £39,515; in 1926, £20,630; and in

1927, £24,144. The amount to which the co-partners and stockholders would each have been entitled—*i.e.*, one-sixth of the amount of the consumers' benefit—in 1924 would have been £14,422; in 1925, £6586; in 1926, £3438; and in 1927, £4024. Applying the shareholders' share as an increment of dividend (on the basis of a 5½ p.ct. basic dividend, as now proposed), the dividends which would have been authorized in the years from 1922-27 inclusive were £5 10s., £5 10s., £6 16s. 1d., £6 1s. 1d., £5 15s. 8d., and £5 16s. 6d. The dividends actually paid under the sliding-scale, however, were £6, £6 5s., £6 10s., £6 10s., £6 10s., and £6 10s.

The CHAIRMAN said the Company would not be making larger profits by means of a change in system; there would be merely a change in the distribution of profits.

Witness replied that there was something more than that. Under the basic system there was a greater incentive to economical working.

The CHAIRMAN asked how a change of system increased the amount to be divided.

Lord BERTIE OF THAME said he supposed the answer to that was that there was greater incentive.

Witness agreed. He produced a statement showing the amounts paid by consumers of the Gas Light and Coke Company and the South Suburban Company in excess of the amount they would have paid had the price of gas been the same as charged by the South Metropolitan Company, in the years from 1921 to 1927; the two former Companies working under the sliding-scale, with revision by the Board of Trade, and the latter Company under the basic system. The three Companies were supplying in London, under practically identical conditions so far as labour, supply of materials, &c., were concerned. In 1921 the Gas Light and Coke Company's consumers had paid £1,592,896 more for their gas than they would have paid had the price been the same as that of the South Metropolitan Company, and in 1922 they had paid £601,683 more. The consumers of the South Suburban Company had paid £218,862 more in 1921 and £172,191 more in 1922 than they would have done had the price been the same as that charged by the South Metropolitan Company. The same story ran right through the following years, though in a less degree.

Witness, in reply to Mr. Maitland, said the sales of the Gas Light and Coke Company were about twice those of the South Metropolitan Company.

The CHAIRMAN asked what sort of discounts were allowed by the South Metropolitan Company.

Witness said that the largest discount was 30 p.ct., where there was an all-day load during the week, and in most cases a load which did not arise on Sundays.

Lord BERTIE OF THAME asked what percentage the allowance of discounts to industrial consumers would add to the price paid by the ordinary consumer.

Witness said that the amount of gas sold at a discount was only about 10 p.ct. of the total quantity supplied by the Company.

Major ROPNER asked for witness' view with regard to a limitation of discount being imposed.

Mr. ABADY reminded the Committee of the suggestion already made, that the total amount of discount allowed should not exceed a halfpenny per therm over the total quantity of gas supplied.

Witness said that as a practical man he saw no difficulty in working the basic system with such a proviso. He would also accept the proviso that no dividend in excess of the basic dividend should be paid if the price of gas were equal to, or in excess of, the basic price.

The CHAIRMAN asked Dr. Carpenter what he thought he could do in the way of accepting some measure of limitation in regard to special consumers.

Witness said that limitations were things which he had always been very anxious to avoid. For many years he had tried to get as much freedom in running gas companies' businesses as was compatible with the position they occupied as public utility undertakings. When the sliding-scale system was first adopted, gas had really a monopoly, for it was used in all large buildings, in middle-class dwellings, &c., for lighting. To-day, however, gas had not a monopoly, and the position of the consumer, from the point of view of obtaining fair treatment by the companies, was much more safeguarded by the nature of the competition with gas than it ever was before.

Sir F. WATSON asked what was the price at which gas was to be supplied in bulk to the South Suburban Company by the South Metropolitan Company under the new agreement.

Witness said it would be 35 p.ct. below the price at which the South Metropolitan Company sold gas to the ordinary consumer. It was anticipated that this gas would be made by the more up-to-date plant, which was more efficient than some of the other existing plant.

Mr. BROWN pointed out that the Wandsworth, Wimbledon, and Epsom District Gas Company charged less per therm than the South Metropolitan Company; and he asked if the Wandsworth Company were operating under the sliding-scale or the basic system.

Witness said they were working under the sliding-scale system, but the reason for the lower price was that the district was expanding enormously.

Earl DE LA WARR asked if that did not mean more capital expenditure.

Witness agreed, but said that, on the other hand, plant was more productive to-day than formerly, and for a certain capital expended in plant, a better result was obtained.

Mr. J. F. RONCA (Director of Gas Administration at the Board of Trade), referring to the sale of gas in bulk to other gas companies, said he gathered the promoters were prepared to make it clear, if there was any doubt, that such sales were to be excluded from the calculation of surplus profits to be allocated to the payment of dividends in excess of the basic dividend, and to the co-partners.

Witness agreed, and said that the South Metropolitan Company had never regarded the South Suburban Company as a "consumer" because that Company were to take a bulk supply.

Mr. RONCA remarked that in that case he need not object on this ground. Referring to the clauses in the Bill giving the Company authority to supply power gas, Mr. Ronca pointed out that gas would be sold to power consumers at a lower price than to ordinary consumers, because the cost of supplying power consumers would be less. The fact that it was sold at a lower price would benefit the shareholders under the basic price scheme; and he asked if that were intended.

Witness said it was not intended; but the Company would endeavour to meet the point.

Mr. RONCA then pointed out that if a power consumer, whose load was irregular, installed a gasholder at his works in order to make the load regular, the Company would be able to sell gas to him at a lower price.

Witness said he could not conceive of a consumer erecting a gasholder.

Mr. RONCA pointed out that such a case had been brought to his attention during the past few weeks. As the result of charging a lower price to such a consumer, the Company would be entitled to distribute a bigger dividend under the basic system, though the company itself had done nothing to improve the dividend. Would the Company be prepared to meet that?

Witness replied that in an area of 250 square miles he had never experienced such a case; but if such a case arose, he would be prepared to meet the point.

Mr. RONCA, referring to the prices charged by the South Metropolitan Company, said that when operating under the sliding-scale system, the Company had charged a price which was roughly 30 p.ct. below the standard; but under the basic system the price was roughly under 20 p.ct. below the basic price.

Witness suggested that a company operating under the basic system usually worked more closely to the basic price than would a sliding-scale company to its standard price.

Mr. RONCA asked if this were a good feature.

Witness said it was.

Mr. RONCA said that a gas company might increase its sales naturally without any effort on its part. If it were working under the sliding-scale system, the shareholders would not benefit if the price were not reduced, but under the basic system they would benefit, notwithstanding that the extra business was secured without effort.

Witness said this merely showed that one could not have a perfect system.

Mr. RONCA asked if the answer to his question was in the affirmative.

Witness agreed.

Mr. RONCA, commenting upon the emphasis which had been laid upon the fact that under the basic price scheme the co-partners had a statutory right to a share of the profits, suggested that it would be easy in the case of a sliding-scale company, with a minimum dividend, to apply a co-partnership scheme by which the co-partners had a statutory right to their share.

Witness said it would not be so simple of understanding as would a scheme applying to a basic price company.

Mr. F. G. WROTTESLEY, K.C. (Counsel for the Company), said that a scheme giving the co-partners a statutory right to the benefit could be applied to a sliding-scale company, but it had not been done yet.

Mr. RONCA, dealing with the table showing the amounts paid by consumers of the Gas Light and Coke Company and the South Suburban Company in excess of the amounts they would have paid had the price of gas been the same as that charged by the South Metropolitan Gas Company, said he was told that the output of the Gas Light and Coke Company was 12·9 times that of the South Suburban Company, and one had to bear in mind the ratio of output as between the two Companies.

Earl DE LA WARR pointed out that the Wandsworth Company had extended their business, although they were operating under the sliding-scale. This did not appear to agree with the statement that the sliding-scale did not give a great incentive to extend.

Witness replied that the Wandsworth Company had expanded, if he might say so, "in spite of" the sliding-scale.

Mr. WROTTESLEY said that the prices charged by the Wandsworth Company varied in different parts of the district, and the over-all price was 9·75d. per therm; but the price charged by the South Metropolitan Company was 9·09d. per therm. Those were the proper figures to compare.

Mr. *H. T. Manly* (who served as an employee Director on the Board of the South Metropolitan Company for nine years) gave evidence, and said that the basic scheme gave absolute satisfaction to the employees of the Company. As a Director he had played a part in fixing the price charged by the Company; and the fact that the price fixed was such that it did not produce the greatest possible amount for distribution among the co-partners had not created dissatisfaction among them. The officials of the Company had been educating the workers for years, and at the same time the workers had been educating the officials of the Company to their point of view, and there was mutual understanding. The provisions of the Company's Act of 1920 in regard to the basic scheme represented the opinions of the workmen as much as the opinions of the officials of the Company. There was nothing affecting the workmen which they had not a full opportunity of understanding. They appreciated the fact that they had a statutory right to their share of profits. Prior to the passing of the Act of 1920, the workmen had felt that they were not fairly treated; they had a profit-sharing privilege which the Directors could vary or take away at will, but since 1920 they had had a statutory share not only in the profits, but in the responsibilities of the Company; and they knew that no one but Parliament could vary it or abolish it. The men understood that before they could receive 10s. under the present scheme they had to give the consumer £1, and that unless they were able, by their efforts, to give the consumer some benefit, they would get nothing themselves.

Mr. WALLHEAD asked if witness, as a Director of the Company, was in a position equal to that of the other Directors, and had access to the books, so that he knew the price of coal, residuals, &c.

Witness said he had access to everything. When the men had

wanted to know why there was not enough money in the coffers of the Company to pay them the full amount to which they were legally entitled, having in view the benefit which the consumers had had, they had come to him for information. He had explained the reasons to them, and had told them that it was not policy to increase the price so that they could receive their full share. They had been satisfied with the explanation, because they regarded themselves as part and parcel of the Company, and did not want to see the business damaged.

Sir *William Plender* (Senior Partner, Messrs. Deloitte, Plender, Griffiths, & Co., Chartered Accountants, and a Past-President of the Institute of Chartered Accountants) gave evidence in support of the Bill, and said that the three important principles of the basic system were a fair price to the consumer, a fair wage to the workers, and a reasonable minimum return on capital.

The Chairman asked whether a co-partnership scheme giving the workmen a statutory right to their benefits could be applied to a sliding-scale company, or whether such a scheme was inherent only in the basic system.

Witness said he supposed it could be applied under the sliding-scale.

Mr. Wrottesley said that in fact no one had worked out exactly how it could be done.

Witness said that was so far as he knew. The practical test of the merits of the system in the case of the South Metropolitan Company was that since it had been in operation the price charged by the Company appeared to have been below that of the other metropolitan companies. To illustrate this he produced a table showing the average prices charged by the South Metropolitan Company with those charged by the Gas Light and Coke Company and the Commercial Gas Company in each year from 1922 to 1927, which demonstrated that in each year the South Metropolitan price was the lowest.

Dealing with the figures for 1927 as illustrating the working of the system, he said that in that year consumers had benefited, by reason of a reduction in price below the basic price of 11d., to the extent of £709,476. The stockholders were entitled to receive one-sixth of that amount by way of further dividends above the basic dividend—*i.e.*, £118,246—and the co-partners were entitled to a like amount by way of bonus. The profit available in that year to meet the extra dividend was £83,238, and there was a like amount available to meet the co-partners' bonus. The amount actually paid in extra dividend was £82,623, and the same amount was paid to the co-partners. It seemed that the main consideration of the Company had been to supply cheap gas, and not to provide large dividends; and this had been the policy of the Company for a great many years past. The dividend could not be said to be extravagant. The average dividend over the last four years was 6 p.ct. He saw no reason why a system which had operated so successfully in this case should not be operated successfully by the South Suburban Company, particularly in view of the fact that the Directors of both Companies were the same.

The Chairman asked whether, leaving out of consideration the contention that the basic system gave the Company a greater incentive, the witness could not say that, as a matter of mere figures, the South Metropolitan Company had done better under the basic system than it would have done under the sliding-scale.

Witness said that this was a question which could best be answered by Dr. Carpenter, but he believed Dr. Carpenter would answer in the affirmative.

The Chairman asked whether, apart from the question of increased incentive, he was right in thinking that there were not additional profits, but that the scheme was merely a scheme of distribution of the profits that had accrued.

Witness replied that there were other issues beyond the increased incentive. There was the fact that the workpeople understood the position better, and there was the probability—he could not put it higher than that—that a basic price company, with its statutory minimum dividend, was likely to get money more cheaply in the market than was a sliding-scale company.

The Chairman asked why.

Witness said that the stocks of statutory companies, and particularly gas and water companies, appealed to the steady-going investor, who did not like to take the risks attaching to the stocks of ordinary industrial concerns.

The Chairman pointed out that the statutory minimum dividend was not a certainty, because if the Company did not make a profit there would be nothing to distribute. He gathered that Sir William considered that the look of the thing encouraged a special clientele to invest in securities of this nature.

Witness agreed.

Lord Henley asked whether, if the basic system had applied during the war, it would have prevented the fall in value of the Company's stock.

Mr. Wrottesley replied that the stock would have suffered less. What had happened during the war was that the sliding-scale had prevented the possibility of paying the dividends even if the money were available.

The Chairman suggested that under war conditions there would not have been enough money to pay the dividends.

Counsel replied that if there had been power to raise prices, and the basic system was applied, a company could probably have made enough to pay the basic dividends. There was probably a point, of course, above which the price could not be raised, because consumers would cease to use gas.

Witness, with regard to the suggestion that excessive discounts might be allowed to large consumers, said it was unreasonable to assume that the Company would abuse their power by giving an excessive proportion of the consumers' benefit to one class of consumer in that way, and only a small proportion to the private consumer. In order to obtain the business of industrial concerns, the Company must give discount. The effect of the consequent increase of sales was to lessen the burden of standing charges, which must be to the benefit of all consumers. A state of affairs in which the authorized dividends were in excess of the amount of money available for dividend was not peculiar to the basic system, but applied equally to the sliding-scale, as the experience of the South Suburban Company showed. In the six years from 1922 to 1927 the authorized dividend of that Company had exceeded the dividend paid, and in some years the amount available for dividend was less than the authorized dividend. For example, in 1924 the authorized dividend was £9 6s. 8d., the dividend paid was £6 10s., and the percentage available for dividend was £5 11s. 11d. Thus, the Board of Trade suggestion that the Company might attempt to raise its prices so that the profits would be approximately equal to the amount of the authorized dividends applied equally to the sliding-scale as to the basic system. The basic price of 11d. per therm, which was proposed in the Bill, he regarded as a fair one, and he explained the method by which it was arrived at, in collaboration with the London County Council's advisers, as follows:

	Per Therm.
The Company's costs and charges of making and selling gas for 1927 were	8·915d.
A basic dividend of 5½ p.ct. on the capital of £1,600,000 (*i.e.*, existing capital of approximately £1,250,000 *plus* £350,000) would cost	1·150d.
Giving cost of making and selling gas, including a basic dividend of 5½ p.ct.	10·065d.
In order to provide the stockholders with the same dividend as hitherto (6½ p.ct.) they must receive in dividend above the basic rate of 5½ p.ct. a further 1 p.ct. (£16,000), which will cost	0·209d.
This entitles the co-partners to receive in bonus a like sum—£16,000 (they actually received £15,547 in 1927)	0·209d.
To cover the costs of manufacture and sale of gas and the above charges, the Company must, therefore, sell gas at a net price of	10·483d.
The payment to the stockholders of £16,000 in dividend above the basic rate, and of a like sum to the co-partners of £16,000 in bonus, means that the consumer must receive a benefit of six times £16,000, or £96,000, equalling	1·254d.
which means that the basic price, in order to produce the consumers' benefit and to bring in sufficient revenue to enable the authorized dividend and co-partnership bonus to be paid, must be	11·737d.

Major Ropner said that if the initiative on the part of the workers and management were to be rewarded by the payment of additional moneys, those additional moneys must be applied out of profits which might otherwise be applied to a reduction in the price of gas.

Witness said the experience was to the contrary—that the greater the incentive, the greater the benefit to the consumer.

Major Ropner said that a very important point for the Committee to consider, therefore, was how much of the product of the increased incentive went to the shareholders and workers, and how much to the consumers.

Witness reminded him that the consumers received three-quarters of the benefit.

Mr. *William Cash* (Past-President of the Institute of Chartered Accountants, and Chairman of a number of gas companies) next gave evidence. Giving his views as to the advantages of the basic system over the sliding-scale system, he said that three of the Companies of which he was Chairman—the Bournemouth, Croydon, and Worthing Companies—were working under the sliding-scale. In arriving at the amount to be distributed as extra dividends under the sliding-scale, one was dependent on the actual price of gas to the ordinary consumers. In view of the increasing demand for gas for industrial purposes to-day, it was essential for a company to develop that part of its business, and it was desirable that consumers of that class should be encouraged, for it was to the advantage of the business as a whole. To the extent to which a sliding-scale company gave discounts to such consumers there was no advantage to the shareholders or the co-partners. He believed gas companies could be trusted to deal fairly with the various classes of consumer under the basic system. There would be no advantage in selling gas at an unremunerative price merely for the purpose of attracting business.

The Chairman asked Mr. Cash what discounts his Companies allowed.

Witness replied that the Croydon Company granted special discounts to large consumers, up to as high 15 p.ct. The Company had a co-partnership scheme, and whatever the dividend paid on the ordinary stock, a like percentage was paid on wages.

A table was submitted, showing particulars of the working of the South Metropolitan Gas Company, which demonstrated that the ordinary consumer was not suffering by a reduction in price to industrial consumers.

Lord Bertie of Thame asked whether, in view of the fact that Mr. Cash believed in the basic system, he had promoted any Bills to apply the system to any of the Companies of which he was Chairman.

Witness replied that he had not, because at the present moment the Companies were working satisfactorily. In the case of two of them, working under the sliding-scale, with a standard price subject to revision by the Board of Trade, the standard price had not, in fact, been revised, and the margin of dividend was such that he was content to carry on as at present. If, however, the standard price were reduced, he would prefer to work on the basic principle.

Sir *Harry Goschen* also gave evidence in favour of the basic system, and said that people who invested money in gas companies knew that in the case of a basic price and dividend company they were sure of a minimum dividend.

The Chairman said the minimum dividend would be paid only if there were sufficient profits.

Witness replied that at all events the investor was far more sure under that system than under the sliding-scale; and if investors knew that they could reasonably expect a minimum dividend, and had a chance of obtaining more, it must be easier for a company to raise capital.

Earl DE LA WARR asked if the values of the stocks of basic price companies were higher than those of other companies.

Witness said he believed they stood a little higher.

This completed the Company's case.

Mr. RONCA, addressing the Committee on the Board of Trade report, and the criticisms of that report, said the Board did not suggest that the South Metropolitan or any other gas company would in existing circumstances treat one particular class of consumer unfairly as against another. There was proof positive that their policy had been one of broadmindedness, and had been a wise one; but if the system were imposed for any reason at all, it was imposed as a system of regulation, and the regulation should not be effected by relying upon the broadmindedness of undertakers. They should not attempt to impose a system which looked like control but was not control. Tables submitted by the promoters of the Bill had shown that the prices charged for gas by the South Metropolitan Company when operating under the sliding-scale system were of the order of 30 p.ct. below the authorized price, whereas since the basic system was introduced the prices charged for gas were about 20 p.ct. below the authorized basic price. At the same time, whereas under the sliding-scale the authorized dividends in most cases coincided with those actually paid, and, in a few cases in which the authorized dividend exceeded the dividend paid, the excess was only of the order of 5s., since the basic system had been introduced the authorized dividends had exceeded the dividends paid by larger amounts, and in one case by £2 9s. He could appreciate the point that the difference was due to the fact that the Directorate had been broadminded and had not paid what it might have paid, and in a measure the Board of Trade were prepared to accept that; but they could not think that this was the case wholly. They submitted that under the basic system it was much more difficult to calculate what should be the magnitude of the basic dividend and the magnitude of the related basic price, than it was to calculate the proper standard price and standard dividend under the sliding-scale. From the very fact that discounts came into the calculation, and the increase in consumption by industrial consumers could not be foreseen with anything like the accuracy with which the increase in consumption by ordinary consumers could be foreseen, one was faced with unknowns which were not considered in the sliding-scale system. In support of that view he referred to the fact that in 1920 Sir William Plender had thought that 6 p.ct. was a reasonable basic dividend for the South Metropolitan Company, but Parliament had agreed to 5 p.ct. Had Parliament allowed a basic dividend of 6 p.ct., the difference between the dividends paid and the dividends authorized since the application of the basic principle would have been even greater than he had already indicated. They would have been increased by £1 in each case. Finally, he said that none of the facts in the Board of Trade report were challenged. The interpretation of them had been challenged, but he urged that the interpretation the Board had placed on those facts was not so far from the truth as had been suggested.

The Committee then conferred in private. When the parties were re-admitted to the room,

The CHAIRMAN said that the Committee accepted the adoption of the basic principle for the purposes of this Bill. At the same time, he added that the views of the Board of Trade had been very ably put forward. The Committee agreed to the basic price of 11d. per therm, but had decided that the basic dividend should be 5 p.ct., instead of 5½ p.ct. as proposed in the Bill originally. In accordance with the suggestion of the promoters, there would be a proviso that there should be no dividends paid in excess of the basic rate of dividend in respect of any period in which the price charged to the ordinary consumer of gas was equal to or in excess of the basic price. With regard to the clause providing that not later than 1933 the South Suburban Company must promote a Bill proposing a revision of the scheme or giving an opportunity for revision, the Chairman suggested that, in view of the intimation which had been given that there might be an amalgamation of the South Suburban and the South Metropolitan Companies, and the fact that the South Metropolitan Company had to come to Parliament not later than 1935 for the purpose of enabling a revision of its scheme to be made, it might be better that the same date should apply to the South Suburban Company.

Mr. TYLDESLEY JONES agreed.

The CHAIRMAN said that that amendment would be made. This, of course, would not commit the Companies to amalgamation.

With regard to the clauses dealing with the supply of power gas, it was stated that these would be re-drafted, and that the Company's representatives would confer with Mr. Ronca, and would make the concessions they had already expressed a willingness to make.

The CHAIRMAN asked what was the position with regard to the Dover Gas Company's Bill.

Mr. JACQUES ABADY (for the Dover Company) said he hoped that, in view of the Committee's decision on the South Suburban Bill, there would be no opposition to the application of the basic principle to the Dover Company, and no opposition to the Bill.

The CHAIRMAN said that the Bill would be reported.

CLEETHORPES URBAN DISTRICT COUNCIL BILL.

Gas Company's Petition.

In a Bill promoted by the Cleethorpes Urban District Council there are a number of clauses giving the Council power to carry out various works in public streets. The Cleethorpes Gas Company, being apprehensive that such works might affect their mains and apparatus, and impede the supply of gas, or might involve them in expense, petitioned with a view to securing protection. As a result, a clause has been agreed between the parties, and inserted in the Bill, which was recently considered by the Unopposed Committee of the House of Lords, and ordered to be reported for third reading.

One clause in respect of which the Company petitioned gives the Council power to construct and maintain in public streets electrical sub-stations, transforming stations, and other works in connection with their electricity undertaking. The Company expressed apprehension that works of considerable magnitude might under the clause be carried out in highways in which their apparatus was situate, and that such works might endanger the apparatus or impede the supply of gas. Further, they might render access more difficult. They pointed out that the Electric Lighting (Clauses) Act, 1899, contains provisions for the protection of apparatus of gas companies where the operations to be carried out involve the digging or sinking of a trench for laying or constructing new electric lines or other works near to which apparatus of the Gas Company has been placed. It might be claimed, however, that such provisions did not apply in the case of such works as were contemplated by the clause in the Bill, and therefore they asked for full protection.

Another clause referred to in the petition gives the Council power to vary the relative widths of the carriageways and footways of public streets. Such variation, it was pointed out, might affect the Company's apparatus, and render it liable to injury from traffic passing along the carriageway, against which the Company would not have made provision. Therefore they asked that the Council should be required to repay any expense incurred by the Company in altering the position of apparatus with the object of protecting it against injury resulting from the exercise of the powers sought by the clause. Again, power was sought to exchange land (including land forming part of a street) for other land, for the purpose of adjusting the boundaries of streets. Land so exchanged, it was pointed out, might include portions of streets in which the Company's apparatus was situated, in which case it would be essential for the position of the apparatus to be altered. Therefore it was urged that any alteration of position so necessitated should be effected at the cost of the Council. Powers were also sought by the Council to construct shelters or waiting rooms, cloak rooms, store rooms, &c., on tramway and omnibus routes; and the Company asked for protection against apparatus being endangered or interfered with as the result of the provision of such structures

The following is the clause inserted by agreement in the Bill:

For Protection of Cleethorpes Gas Company.—Notwithstanding anything in this Act contained, the following provisions for the protection of the Cleethorpes Gas Company (in this section called "the Company") shall (in addition to any other provisions enuring for the protection of the Company) unless otherwise agreed in writing between the Council and the Company, apply and have effect (that is to say):

(1) In this section "apparatus" means and includes all or any mains, pipes, syphons, tubes, and fittings or other apparatus belonging to the Company.

(2) The provisions of section 18 of the Schedule to the Electric Lighting (Clauses) Act, 1899, shall *mutatis mutandis* extend and apply to the execution by the Council near any apparatus of any works under the authority of the section of this Act of which the marginal note is "Power to construct electrical sub-stations under streets" as though the execution of such works were the digging or sinking of a trench for laying down or constructing new electric lines (other than service lines) or other works within the meaning of such first-mentioned section.

(3) Whenever the Council, in the exercise of the powers of the section of this Act of which the marginal note is "Power to determine width of carriageways and footways," shall add to the carriageway of a street any portion of the footway in which there shall be any apparatus, the Company may alter the position of such apparatus to such a depth below the surface of the carriageway or to such other position as may be reasonable having regard to the circumstances; and the Council shall repay to the Company the reasonable expenses of, and in connection with, such alteration of depth or position.

(4) Whenever the Council, in the exercise of the powers of the section of this Act of which the marginal note is "Adjustment of boundaries of streets," shall give up land forming part of a street in exchange for other land, there then being in such first-mentioned land any apparatus, the Company may alter the position of such apparatus to such other position as may be reasonable having regard to the circumstances, and the Council shall repay to the Company the reasonable expenses of, and in connection with, such alteration of position.

(5) The Company shall give to the Council not less than twenty-one days' notice of their intention to alter the position of any such apparatus under the provisions of sub-sections (3) or (4) of this section, and shall at the same time deliver to the Council a plan, section, and specification of the proposed alteration. If such plan, section, and specification are not disapproved by the Council within twenty-one days from the receipt thereof, the depth or position of apparatus shown thereon shall be deemed to be reasonable.

(6) If any difference arises with respect to any matter under this section between the Council and the Company, the matter in difference shall be referred to an arbitrator to be appointed on the application of either party after notice thereof in writing to the other by the President of the Institution of Civil Engineers, and subject as aforesaid the provisions of the Arbitration Act, 1889, shall apply to any such reference.

TOTTENHAM DISTRICT LIGHT, HEAT, AND POWER COMPANY'S BILL.

The Bill promoted by the Tottenham District Light, Heat, and Power Company, the main purpose of which is to provide for the transfer to the Tottenham Company of the Waltham and Cheshunt Gas Company (see "Journal" for Feb. 1, p. 269), was before the Unopposed Committee of the House of Lords on Monday, May 21, and has been reported for third reading. One or two amendments have been made. The clause giving the Tottenham Company power to charge 4d. per therm more in the Waltham district than in the Tottenham district for the first ten years, and 3d. per therm more thereafter, has been amended to make that extra charge compulsory. A proviso has been added, however, to the effect that any time after three years from the passing of the Act the Board of Trade may, on the application of the Company or of the Hertfordshire County Council, or of any local authority having jurisdiction within the Waltham district, by Order alter and amend these provisions; but before making any such Order, the Board shall give notice of the application to the Middlesex County Council and all local authorities having jurisdiction in the Tottenham district, and shall consider any representation with regard to such application which may be made by them.

The clause relating to the capital reserve fund, which clause was reproduced in the "Journal," has been deleted from the Bill.

There are a number of protective clauses. One imposes penalties upon the Company if it allows any washing or other substance produced in working-up and converting residual products on specified lands to flow into the River Lea navigation or into any drain communicating therewith, or if it wilfully does anything connected with the working-up or conversion of the residual products on those lands whereby the water shall be fouled.

There are also provisions for the protection of the London and North Eastern Railway Company in connection with the breaking-up of its streets in the Waltham area, and for the protection of the Lea Conservancy Board with regard to towing paths, bridges, &c. Still another clause provides for notice to be given to the Commissioner of Metropolitan Police of the intention to break-up public streets, except in the case of emergency, or the laying or repair of service pipes.

LEGAL INTELLIGENCE.

JOHN WRIGHT AND EAGLE RANGE COMPANY, LTD., v. GENERAL GAS APPLIANCES, LTD.

Judgment was delivered in the Chancery Division on Friday, May 25, by Mr. Justice Eve, in this action, in which the plaintiffs asked for damages for alleged infringement of their patent No. 18,995 of 1913, granted to Mr. H. J. Yates, for a certain class of gas fire for heating purposes. The defendants denied the infringement and alleged that the patent had been anticipated, and that it was void because of prior user, common knowledge, and insufficiency of particulars. The hearing of the case was reported in the "Journal" on May 9, 16, and 23.

His Lordship said that by the year 1913 there were on the market a number of stoves of similar design and type to the plaintiffs'; but there was a difference in the manner in which the waste products were carried away, and the efficiency of the stove, as regards ventilation, varied. The patent of Henry James Yates claimed improvements in gas stoves for application to the front of existing coal fire grates, with a limited orifice; and the gas fire had, by this time, become a maker's, rather than a fitter's, job. When gas fires were fitted with an added plate over the chimney—having a products outlet flue hidden by a canopy—air might pass through the edges of the gas fire and join the products of combustion in the chimney. Attempts were made to satisfy the demands of physiologists for improved ventilation of the room without loss of radiant efficiency in the stove; and all had to be done without spoiling the appearance of the stove. As to the inner canopy fitting closely under the outer canopy, he found that, in the prior "Apollo" stove, it was never intended to develop the ventilating side. Air was a good conductor; and it was introduced as a cushion to preserve from heat the enamel of the outer canopy. But that intercanopy space did result in a certain amount of ventilation, the result of which was unintentional. It was to be remembered that there might be invention in an idea, although the carrying out of the idea might be perfectly easy; but in a patent such an idea must be fertile. Nothing was invented unless one thought of some obvious or new way of doing something that had often been done before. Comparing the development of stoves about the year 1913 with what had gone before, it was clear that whether one obtained equal or improved efficiency depended on the shape, disposition, and construction of the passages—matters on which the patentee here had given no information. The plaintiffs had alleged that any skilled person would know of those things; but he was by no means satisfied on this point. Since September, 1912, when an article appeared in a technical journal, it was known how to place the products flue so as not to affect the radiants; and an air passage above this flue, designed by any competent person, would be still less liable to do this. It was said that the subject matter of the invention must depend almost entirely on the addition of an air passage; but that idea was not entirely novel, except as regards its position under the canopy; and he had, in the circumstances, come to the conclusion that the patent failed for lack of subject-matter. There was no invention involved in placing an added passage under the canopy; and he could discover no advantage of construction that would serve to uphold the patent.

The plaintiffs and defendants had made tests and experiments. Unfortunately, there had been no agreement as to what was to be proved by those experiments. Neither side had had the opportunity of watching the experiments of the other or seeing the appliances used. However, figures had been placed before the Court. The plaintiff's experiments, in effect, showed that two apertures gave better ventilation than the lower one alone; but that was an obvious result, known to be so before 1913. From the tests, he concluded that radiant efficiency depended greatly on the contour and position of the flues; and the opinion he formed was that plaintiff's tests were wholly insufficient to prove the inventor's assertions or promises. They established what merely was known as obvious before—that if there were two passages under the canopy, there was less ventilation when one was closed—and they also proved that the contour and position of the flues were vital matters for radiant efficiency. They did not prove that the two passages would necessarily or generally possess any advantage over the single passage or give more ventilation unless there was a joint area substantially larger than the single passage. He thought plaintiff's claims were too wide.

Dealing with the question of prior user, His Lordship remarked that the "Apollo" gas gap did not, in fact, operate as a method of adding to the ventilation of a room; and he had come to the conclusion that the "Apollo," were it a new device, would be an infringement of the patent, and that, by parity of reasoning, its commercial pre-patent use made the patent invalid. It was suggested that the specification was insufficient—that, firstly, it did not state that the exhaust products flue into the chimney must be at a higher level than the opening of the air passage—*i.e.*, higher than the place where the air from the room entered the air passage—and, secondly, it was insisted that the specification contained no information with regard to the proportions, dimensions, and contours of the two passages. In the third place, it was argued that the specification did not point out that the passages should be so arranged that the streams of products of combustion and of air should be kept parallel, so as to avoid a baffling effect. He had come to the conclusion that, at any rate, the first two of those grounds of insufficiency would be fatal to the patent, if it were otherwise valid. With regard to the first point, Dr. Hartley, in cross-examination, had stated that, in practice, the plaintiff's flues were so constructed that, in all cases, the exhaust products flue was higher than the air inlet; that this was essential, because otherwise gas fires would not pass the "Lancet" test—that was to say, would not properly take away the products of combustion—and they were not commercial articles unless that test was passed. Nothing had been said in the specification about the necessity of so arranging the air passages that the combustion products exit was higher than the air inlet passage; and in figs. 1 and 2 attached to the specification, that condition was not observed. Equally serious was the absence of all information as to the contours of the two passages. Dr. Bone, one of the plaintiff's witnesses, and Dr. Hartley clearly had admitted the importance of such information; while the plaintiff's themselves, in their catalogues, had taken the same view, because stoves made according to the patent were put upon the market under the description "New Patent Injector-Ventilating" stoves. The catalogue for the year 1914-15 stated that the entire products of combustion were carried off by a special orifice for the purpose; while above that was formed an air outlet of larger area, through which a big volume of air was induced to pass—far larger than was possible in the case of the gas fire constructed on existing lines. It was claimed as of supreme importance that this effect was obtained without loss of heating efficiency. Then, after a statement of the great advantages from the point of view of ventilation, the catalogue contained this:

> "At first sight, the principle looks simple, as many valuable things look when once they are done. A hasty observer might fancy it only meant an opening for air to pass between the two canopies. In reality, this invention has occupied a staff of chemists over a year to arrive at the delicately balanced accuracy of shape and proportion essential to give the result and yet pass the stringent chemical tests at every stage, so as to ensure (*a*) the entire exclusion of combustion products from the free air outlet, (*b*) the passing through it of a sufficiently large volume of air, and (*c*) the maintenance of the full heating efficiency."

Continuing, His Lordship said he thought this was not a mere "puff" of a manufacturer; and he saw no reason to doubt the truth of the statement that the plaintiffs had employed a number of skilled persons to arrive at a delicately balanced accuracy of shape and proportion essential to give the result—for, as he had already pointed out, it was beyond dispute that an alteration of the shape of such passages as were in question in this case would have the most marked effect upon the amount of the products of combustion and of air which a particular gas fire would pass in an hour. On that ground of insufficiency, therefore, in addition to the other grounds, he thought defendants were entitled to succeed in the action, which would fail, and be dismissed with costs.

MISCELLANEOUS NEWS.

L.C.C. AND GAS LEGISLATION PROPOSALS.

REPORT BY THE PUBLIC CONTROL COMMITTEE ADOPTED.

The following report of the Public Control Committee dealing with the proposals by the National Gas Council for amending gas legislation was adopted without debate by the London County Council at their meeting on Tuesday, May 22.

The National Fuel and Power Committee appointed by the Board of Trade have had before them proposals by the National Gas Council for amending gas legislation, and have appointed a Gas Legislation Sub-Committee to inquire into these proposals on their behalf. A copy of a memorandum prepared by the National Gas Council containing these proposals has been forwarded by direction of the Sub-Committee, with a view to the Council submitting observations thereon, should it so desire, for consideration by the Sub-Committee.

The National Gas Council preface their detailed proposals for amending general gas legislation by a short résumé of the circumstances in which the Gas Acts have been evolved. The purpose of this introduction to the memorandum is to show that, although the grant of monopoly powers to gas companies in the earlier years of the industry may have justified the legal restrictions imposed upon them, the early conditions no longer obtain, owing to the competition of electricity and to the increased use of gas for heating purposes both in domestic and in industrial processes. They express the opinion that a complete overhaul and amendment of the existing general gas legislation should be undertaken at the earliest opportunity. They recognize, however, that a complete review of existing legislation would involve considerable delay; and they press for some of the more urgent matters to be dealt with without waiting for the more comprehensive measure which, they consider, is required to place the regulation and control of the gas industry upon a sound and business-like footing.

The continuance of any restrictions which tend to hinder the reduction of the costs of production of gas is, of course, to be deprecated; but we consider that the London Gas Companies are not unduly hampered by legal restrictions. Many of the reforms or amendments proposed by the National Gas Council have already been applied to the London Companies by their Private Acts; and the purpose of the National Gas Council appears to be, in many details, to extend the application of the London conditions to provincial undertakings.

The detailed proposals are grouped under three heads:

(1) Those dealing with financial matters.
(2) Those facilitating co-operation and joint working.
(3) Miscellaneous proposals.

The proposals are set out briefly below, with our observations upon them.

Financial Matters.

Authority to Raise Capital.—The National Gas Council propose that companies should be authorized to raise capital without the sanction of Parliament; the consent of the Board of Trade alone being required, the principal reason urged being that the present procedure is costly.

The Board of Trade may now, by Special Order made under section 10 of the Gas Regulation Act, 1920, authorize the raising of capital or the borrowing of money for various purposes by gas companies; the Special Order in question having to be approved by Parliament. Before the introduction of this procedure, new capital powers could only be obtained by the promotion of a Bill in Parliament, which afforded the Council (so far as London Gas Companies were concerned) valuable opportunities of raising questions affecting the public interest. Even now, new capital powers are being sought by Bill in Parliament, as in the case of the South Metropolitan Gas Company this session.

If the Board of Trade were, as suggested, empowered to authorize the raising of new capital by Departmental Order without recourse to Parliament, the present powers of public authorities and others to object to the proposal would be considerably limited. At present, in the case of such an application by Bill in Parliament, the opponent has the opportunity of petitioning in both Houses, and of raising almost any question bearing upon the administration of the undertaking concerned from the point of view of the interest of the consumer. In the case of an application for a Special Order to the Board of Trade, the opponent has not only the opportunity of objecting to the Draft Order, and being heard thereon at the Board of Trade inquiry, but can also take steps in opposition when the Draft Order is laid before both Houses of Parliament for approval by resolution. Under the proposal of the National Gas Council, the only action possible would be before the Board of Trade.

The South Metropolitan Gas Company obtained in 1920 special powers which rendered them largely independent of the jurisdiction of the Board of Trade under the Gas Regulation Act as regards charging powers; basing their case on the assumption that Parliament, rather than a public department, was the appropriate body to deal with these matters. In this connection, we would draw attention to a statement made by Mr. Macmillan, K.C., as Counsel for the Company's Bill of 1925 which gave an opportunity for the powers granted in 1920 to be reviewed, and was opposed by the Council. Counsel, in addressing the Select Committee of the House of Commons on the Bill, said: "We have always taken the view that Parliament is the proper body to revise in these matters. The whole history of the gas industry has been that Parliament has revised the prices . . . and we prefer the parliamentary system of regulation which has obtained in the past, and we do not want to revert to a method" (departmental revision) "which has been discredited." In 1927 the Commercial Gas Company obtained similar powers to those of the South Metropolitan Company; and the South Suburban Gas Company are following the same example this session. The National Gas Council now suggest that powers hitherto exercised by Parliament should be transferred to a public department.

Looking at the matter from the standpoint of London, we consider that the proposal to empower the Board of Trade to authorize the issuing of new capital should not be acquiesced in; and we submit a recommendation accordingly.

Introduction of a Minimum Dividend in the case of Sliding-Scale Companies.—All the London Companies except the Wandsworth, Wimbledon, and Epsom Company, are now authorized to pay minimum dividends, assuming that the South Suburban Gas Company's Bill of the present session will become law. The principle may therefore be regarded as established in London.

Amendment of Section 1 of the Gas Regulation Act, 1920, with a view to the establishment of such Standard Prices and Dividends as will give a Reasonable Return upon Capital.—The National Gas Council suggest an amendment of section 1 of the Gas Regulation Act, 1920, with a view to the establishment of such standard prices and dividends as will give a reasonable return upon capital. Of the five Gas Companies supplying in London, two (the South Metropolitan Gas Company and the Commercial Gas Company) are not subject to section 1 of the Gas Regulation Act, owing to special legislation obtained by them, and the South Suburban Gas Company is proposing to place itself in the same position by its Bill this session. We do not consider that any amendment of the enactment in question is necessary in its application to the other two Companies.

Undertakings to be able to offer Shares or Stock to Consumers, Stockholders, or Employees upon terms defined by the Board of Trade, before the same are offered for Sale by Auction or Tender.—The London Companies, except the Gas Light and Coke Company, have power (subject to the approval of the Board of Trade) to offer their stocks in the first place to their consumers and employees at as near as may be the average market price at the time. Any stock not taken up by the consumers and employees must, before being offered to the shareholders of the Company, be offered for sale by public auction or tender; a reserve price being fixed. Any stock still remaining unsold may be offered to the Company's shareholders at the reserve price. In the case of the Gas Light and Coke Company, all stock must be first offered for sale by public auction or tender. Any stock remaining unsold after such offer may be issued to consumers, employees, or shareholders at the reserve price.

The National Gas Council state that they consider that great advantage would accrue to gas undertakings by associating consumers and employees in the prosperity of the undertaking. They do not state any reason for their proposal that undertakings should be authorized to offer new issues to their stockholders; and we are advised that, apart from a saving in the expenses of issuing the stock to the public, this practice would not be likely to facilitate the raising of capital at cheap rates. We do not consider, therefore, that any general alteration of the conditions of issue of shares or stock by the London Companies is necessary.

The Borrowing Powers of Undertakings to be made equal to the full amount of the Paid-up Capital.—The practice of the London Gas Companies in recent years has been to apply for authority to borrow up to one-half of the amount of their ordinary and preference capital; and this proportion has been allowed by Parliament when asked for. The Council has not objected to this as a general principle, seeing that it is to the interest of the consumers that capital should be raised as cheaply as possible. For the same reason, it does not seem necessary to object to the proposal of the National Gas Council to raise still further the proportion of loans to capital. In our opinion, the question of the ratio of borrowed money to the capital issued may be safely left to the shareholders, whose interests, in the case of sliding-scale companies, are identical in this matter with those of the consumers.

Statutory Companies to be empowered to create and issue, in lieu of the Ordinary Stock already Authorized, Redeemable or Irredeemable Preference Stock.—Powers of this kind have been given to the London Companies, except the Gas Light and Coke Company, by recent Acts. The Council has not offered objection to this proposal when put forward in Private Bills by the London Companies.

Undertakings to be empowered to redeem Obsolete Capital out of Revenue, subject to the sanction of the Board of Trade.—If any gas company has on its books a large amount of obsolete capital, the question whether it should be written off out of revenue account or out of divisible profits should depend, in our opinion, on whether or not there has been negligence or bad management on the part of the company in having allowed the obsolete assets to accumulate. We consider that if any new power to redeem obsolete capital were conferred, it should be accompanied by power to the Board of Trade to require a company to redeem obsolete capital out of divisible profits, if that course appeared to be justified. In any case, the local authori-

ties should be entitled to be heard before any Order is issued by the Board of Trade.

The Board of Trade to be empowered to sanction modifications in the Methods of Charging for Gas.—The main object of this proposal is to allow gas companies to charge for supplies by means of a two-part tariff—*i.e.*, a periodic charge of a fixed amount to cover the standing charges which have to be incurred in making a supply available to the consumer, and a further charge according to the quantity of gas taken by the consumer. A tariff of this kind cannot be used by a company working under the old form of sliding-scale of price and dividend; but there would be no difficulty in its application by a company working under the basic price and basic dividend system.

The National Gas Council state in their memorandum:

> It is obviously unfair that a person who uses gas occasionally should pay only the same amount per 1000 c.ft. or per therm as a person who uses gas for all purpose, as this means that a large proportion of the capital and overhead costs in maintaining the undertaking in a position to meet possible demands for gas are borne by gas undertakings' best consumers, thereby unfairly relieving those whose claims for consideration are weakest.

The two-part tariff is, no doubt, a more scientific form of charge than the flat rate; but if it is introduced, it will be necessary to provide in some way against the possibility of the charges to the consumers in the smaller houses being unduly increased on account of the change. A two-part tariff which does not allow any consumption for the initial charge (as in the case of the telephone tariff) might meet with some opposition by consumers. It would probably be more convenient to introduce the system commonly used by electricity companies, by which a charge is fixed per unit for a certain number of units per quarter, any additional units consumed being charged for at a lower rate. The telephone system might be offered as an alternative, at the option of the consumer.

Subject to these reservations, we do not think the proposal calls for objection on the part of the Council.

PROPOSALS FOR FACILITATING CO-OPERATION AND JOINT WORKING.

Several of the proposals under this head fall at present within the powers of the Board of Trade under section 10 of the Gas Regulation Act, 1920. This section authorizes the Board, on the application of any local authority, company, or person, to make Special Orders for a number of purposes—*e.g.*, purchase of gas in bulk, the giving of separate supplies for industrial purposes, amalgamation or joint working of gas undertakings, &c. Such Special Orders can only be made by the Board of Trade after the approval of the drafts by both Houses of Parliament by resolution. The National Gas Council consider this procedure unnecessarily slow and costly, and propose that the Special Orders should be replaced by Departmental Orders issued by the Board of Trade.

The proposals in this group are as follows:

(1) The Board of Trade to be empowered to sanction the establishment of Joint Boards or Joint Committees.
(2) Undertakings to be empowered to contribute capital to a pipe-laying company, or to pay rent or toll for the user of pipes owned by such companies.
(3) Undertakings to be empowered to become members of, and contribute to, large territorial gas associations.
(4) Undertakings to be empowered to hold shares in, or lend money to, other gas undertakings.
(5) Undertakings to be granted greater facilities for supplying or purchasing gas in bulk.
(6) Power to make use jointly with other undertakings of any premises, plant, organization, or other facilities relating to the manufacture and sale of gas or products.
(7) Power to undertakings in regard to the joint purchase, transport, landing, and delivery of coal and residual products.
(8) Power to prosecute joint research work in connection with coal and residual products, including the establishment and maintenance of joint laboratories.
(9) Power to provide moneys for carrying into effect any agreement in regard to the powers set out in (6), (7), and (8).
(10) Joint working and co-operation with allied industries, including the right of the gas undertakings to hold shares in, or lend money to, such allied industries.
(11) Power to lay pipes outside the statutory area of an undertaking.

Some of these powers have been granted to London Gas Companies by their Private Acts. Although they would be of more value to small undertakings than to the London Companies, there does not appear to us to be any objection, so far as the Council is concerned, to the application of the proposals to London, provided that provision be made for the advertisement of the application and for the hearing of objectors at a Board of Trade inquiry, before the Board come to a decision upon an application.

In item (11), the National Gas Council suggest that the permission of the Board of Trade should alone be necessary to break-up highways for the purpose of the laying of pipes outside the area of a statutory gas undertaking. The Council is only a highway authority to a very limited extent; but, in view of its sewers, &c., laid under the streets, this proposal appears to require careful scrutiny. The Gas-Works Clauses Act, 1847, only empowers a company to break-up streets within the limit of the Special Act, and protection for sewers, &c., is provided in the Act which should be applied to any breaking-up of streets as suggested under the authority of an Order of the Board of Trade.

MISCELLANEOUS PROPOSALS.

These proposals are set out below. Most of them do not apply to the London Companies:

(1) The repeal of the Sale of Gas Acts, 1859 and 1860, and substitution of a new provision whereby local authorities can establish gas meter testing stations.
(2) The removal of the present limitation as to the kind and quantity of residuals that may be purchased by a gas undertaking.
(3) The incorporation of a new Gas-Works Clauses Act of numerous powers which can only be secured at present by making special application to Parliament.
(4) Introduction of an inexpensive and simple procedure whereby non-statutory gas companies can become statutory.
(5) Power to obtain "Fringe Orders."
(6) No capital duty to be payable in the case of amalgamation of gas undertakings.

With regard to the first of the above proposals, until opportunity is afforded for the examination in detail of any proposals which the National Gas Council may desire to submit with regard to the repeal of the Sale of Gas Acts, 1859 and 1860, and the substitution therefor of a new provision, no useful criticism can be offered. The proposal as at present outlined refers only to the establishment of gas meter testing stations. There would be great objection to the repeal of the Sale of Gas Acts unless the provisions of these Acts, so far as they relate to the use and stamping of meters, appointment of inspectors, &c., were re-enacted.

The proposal (3) for a new Gas-Works Clauses Act includes a suggestion that power should be inserted in such an Act as regards the laying of pipes for ancillary purposes such as procuring, conducting, or disposing of oil or other material used or resulting from the manufacture of gas or any residual product. The Commercial Gas Company in 1927, and the South Suburban Gas Company in the present session, sought similar powers; but in each case the provisions were dropped as the result of opposition, the ground of objection being that the further breaking-up of streets which would be entailed by the laying of additional pipes should be avoided.

We recommend:

> That, in connection with the proposals submitted to the Board of Trade by the National Gas Council for amending existing gas legislation, the Council is of opinion, so far as such proposals affect London—
>
> (1) That, as the proposal that the Board of Trade should be empowered to authorize the raising of capital or the borrowing of money by gas companies would reduce the opportunities of reviewing the working and management of the companies, such proposal should be opposed.
> (2) That amendment of section 1 of the Gas Regulation Act, 1920, with a view to the establishment of such standard prices and dividends as will give a reasonable return upon capital, is unnecessary.
> (3) That any general alteration of the conditions of issue of shares or stock by the companies is unnecessary.
> (4) That if any new power should be given to the Board of Trade to authorize undertakings to redeem obsolete capital, the Board should be empowered to require that such redemption be provided for out of the divisible profits of the undertakings, if that course appears to be justified, and that the local authority concerned should be entitled to be heard before any Order on the subject is issued by the Board of Trade.
> (5) That any power obtained by gas companies to charge for supplies by a two-part tariff should be accompanied by safeguards against any undue increase in the charges to consumers in small houses.
> (6) That in the event of the Board of Trade being authorized to issue Departmental Orders on proposals submitted by gas companies for facilitating co-operation and joint working, &c., of gas undertakings, provision should be made for the advertisement of the application and for the hearing of objectors at a Board of Trade inquiry.
> (7) That in the event of gas companies obtaining power to lay pipes outside their areas without recourse to Parliament, the protection afforded the Council by the Gas-Works Clauses Act, 1847, in connection with the laying by any company of pipes within the limits of its area, should be extended accordingly.
> (8) That the repeal of the Sale of Gas Acts, 1859 and 1860, should be accompanied by the re-enactment of the provisions of those Acts so far as they relate to models of gasholders, the use and stamping of gas meters, the appointment and duties of inspectors, powers of testing authorities, and the imposition of penalties.
> (9) That the inclusion in a new Gas-Works Clauses Act of power for gas companies to lay pipes for ancillary purposes—such as procuring, conducting, or disposing of oil or other material used or resulting from the manufacture of gas or other residual product—is undesirable.

GAS REGULATION ACT APPLICATIONS.

SPECIAL ORDERS.

Bourne Urban District Council.

To authorize the Council to use scheduled land for gas purposes, to confer further borrowing powers, and other provisions.

British Gas Light Company, Ltd. (Hull Station).

To vary the rate of interest payable by the Company.

Dursley Gas Light and Coke Company, Ltd.

To extend the limits of supply of gas to include the parishes of Stinchcombe and Uley.

Petersfield and Selsey Gas Company.

To authorize the raising of further capital, and for other purposes.

DECLARATIONS OF CALORIFIC VALUE.

Newcastle-upon-Tyne and Gateshead Gas Company.—In the Tynemouth district, 500, in substitution for 470, B.Th.U. (Sept. 1.)

Walton-on-Thames and Weybridge Gas Company.—460 B.Th.U., in substitution for 450 B.Th.U. (Sept. 29.)

MONTEVIDEO GAS AND DRY DOCK COMPANY, LTD.

Sales of Gas Continue to Increase.

The Fifty-Sixth Ordinary General Meeting of the Company was held on Tuesday, May 22, at Dashwood House, Old Broad Street, E.C.—Mr. FRANK H. JONES, M.Inst.C.E. (the Chairman), presiding.

The LONDON MANAGER AND SECRETARY (Mr. Henry Kearns) read the notice convening the meeting and the report of the Auditors; and the minutes of the last meeting were taken as read, as also were the report of the Directors and the statement of accounts for the year ended Dec. 31.

The CHAIRMAN: I will first deal with the points in the balance-sheet. You will see that we have cancelled £5470 of our 5 p.ct. perpetual first mortgage debenture stock; we having acquired during the year £2380. The Trustees for the 6 p.ct. debenture stockholders have bought and surrendered for cancellation the nominal amount of £7218 stock; the amount provided by the Company for redemption and transferred to the Trustees being £6920 6s. On the credit side, we have expended during the year on plant, extensions, and enlargements of mains, additional meters, and cookers £28,258, but have written-off for depreciation £9381; and we have sold property valued at £5173, which we originally acquired in payment of a bad debt. As the property was never likely to be of any use for the Company's business, and the time necessary to give us a clear title had expired, we have disposed of it. The result is that our capital account is overspent by £23,552. We have now provided practically all the new plant required, and brought the old plant up to a high state of efficiency. We anticipate that our expenditure for the next few years will be chiefly on revenue-earning items, such as mains, meters, and cookers, and comparatively only a small amount on plant. The reserve account has been increased by £2000, and now amounts to £75,000. Sundry creditors, which item includes reserves for every contingent liability, stands at £46,207, and is £3260 more than in the previous year. You will notice an item for deferred maintenance amounting to £20,500. This was chiefly reserved during the war years to cover maintenance work and a new dock gate, which could not be undertaken during those difficult times. We have now completed the installation of the gate, and this fund will become available, so that the cost will not fall as a charge upon revenue in the current year (1928), while all repairs effected to our plant and property have been charged against revenue. On the credit side of the balance-sheet, our stock of coal appears to be low; but this item should be taken in conjunction with shipments afloat—a cargo of coal having arrived at the end of last year, which was not discharged until early in January of the current year. Sundry debtors are £881 higher than at the corresponding date of 1926. For the convenience of those of our customers who wish to buy their cookers instead of hiring them, and also of those who instal the indispensable geyser, we have made arrangements so that they may purchase these efficient and labour-saving appliances by monthly instalments; and this item of sundry debtors includes the balances due. Our investment of £50,000 in War Loan has been taken at the lowest market value on Dec. 31, 1927, which was slightly below cost.

GROWING DEMANDS FOR GAS.

In the revenue account, our receipts are down by £1510. We had the satisfactory increase of 5·56 p.ct. in gas sales; and every item of revenue in the gas department showed a gratifying increase. Incidentally, the sale of gas has more than doubled in the last 10 years. The increased revenue in the gas department was, however, nullified by the lower receipts in the dock department. We had a fair amount of work, but prices were low. This department is a very fluctuating one, and entirely dependent upon the number of vessels undergoing repairs at our Port. Notwithstanding that the receipts were less, the total expenditure was higher by £2991. You will remember that when I had the pleasure of addressing you last year, I specially referred to the fact that the American coal shipped at high rates of freights during the six months' coal strike in this country would be used during the year under review. To meet our increased sales of gas, we had to carbonize a larger tonnage; and these two causes increased our coal bill by £8586. Our works are now in a condition to meet the increasing demand for gas; and it has been the endeavour of your Board to give the public in Montevideo a supply of gas equal to the best British conditions. We are well satisfied with the improvement in our service that has taken place. I believe the public also appreciate our efforts, as is evidenced by the increase in the sales of gas of over 10 p.ct. during the first four months of this year. It is being realized in Montevideo that cooking by gas is an absolute necessity, and not a luxury, and that all forms of heating, whether in the house, restaurant, or workshop, can be efficiently and economically carried out by the use of gas, with a great saving in time, labour, and dirt. It will be interesting to you to know that since 1922 we have been constructing in our own workshops all the cookers on hire. Some of the castings we buy, and all the sheet metal and tin work, &c., we manufacture. The reason for this was that the high prices charged for cookers, *plus* freight and heavy Customs duties, made it impossible for us to continue to hire them at a small monthly rental, and we were faced with two alternatives—either to increase the rents, which would have hindered business, or to make them ourselves, and save the intervening profits. The latter alternative, which we adopted, has resulted in our producing cookers, and embodying in them various improvements suitable for our consumers, at practically one-half the cost of those supplied to us in the year 1921. This has enabled us to continue the very moderate hire rentals which were fixed on a pre-war basis; and, what is still more satisfactory, the number on hire at Dec. 31, 1927, was 92 p.ct. more than at the end of 1921, which is a proof of the popularity of the patterns we have produced. With regard to the Absentee Landlords Tax, I regret to inform you that, to our astonishment, our appeal was decided against us, and we had to pay the tax for the years 1916-17 to 1921-22; and another action is now proceeding against us for payment of the tax for the years 1922-23 onwards. Until this is finally settled, I would prefer not to pass any comments. Our contention is that a tax like this was never intended to apply to public utility companies such as ours. I do not think that the net revenue account calls for any remarks beyond the fact that a full year's interest and amount required for amortization of our 6 p.ct. debenture stock has fallen as a charge against profits, compared with only four months in the previous year, and that our balance forward has been reduced by £1739.

THE DIVIDEND.

I now beg to move:

> "That the report and accounts now presented be received and adopted; and that a dividend be, and the same is hereby, declared on the ordinary stock of the Company for the half-year ended Dec. 31, 1927, of 3½ p.ct., free of income-tax, payable on the 23rd of May, and making, with the interim dividend previously paid, 6 p.ct., free of income-tax, for the year 1927."

Mr. EDGAR HORNE seconded the resolution, which was carried unanimously.

The retiring Director (Mr. Edgar Horne) and the Auditors (Sir Laurence Halsey and Mr. William C. Sneath) were re-elected.

The CHAIRMAN proposed a hearty vote of thanks to the whole of the staff and employees. He said the results were excellent, and could not have been attained without much hard work and loyal service.

Mr. HORNE seconded the proposal, which was heartily carried, and acknowledged by Mr. KEARNS, who remarked that their General Manager, Mr. Whyte, and his staff in Montevideo, who so ably supported him, would be much gratified by this expression of thanks.

The Chairman and Directors were also cordially thanked for their services, on the proposition of Col. A. G. HIPWELL, C.B.

BOARD OF TRADE INQUIRY AT LINCOLN.

An application by the Lincoln Corporation for a Special Order to enable them to extend their gas-works and to widen the limits within which they supply gas, so that they can take in several villages near the city, was the subject of a Board of Trade inquiry held in the Lincoln Guildhall on Wednesday, May 23, conducted by Mr. JAMES F. ROXCA (Director of Gas Administration at the Board of Trade). The application was opposed by the Branston and Welton Rural District Councils, and the Lindsey and Kesteven County Councils; the former objecting that the Council should not be allowed to charge the country districts more than the town, and the latter asserting that greater responsibility would be placed upon their highways departments by the laying of gas mains along their main roads. Mr. F. Brown, of Cross o' Cliff Hill, a resident near the gas-works, also objected that the extension of the works would deteriorate his property and be a nuisance.

The TOWN CLERK (Mr. L. O. Need), outlining the Corporation's proposals, said that primarily the Order was for the purpose of enabling the Corporation to acquire 10 acres of land situate opposite their Bracebridge Gas-Works. Secondly, it was to extend their limits of supply to certain parishes in the rural district of Welton, in the county of the parts of Lindsey, which was on the north side of the city, and in the rural district of Branston, in the county of the parts of Kesteven, which was on the south side of the city.

He went on to trace the history of the gas undertaking, which, he said, had been owned by the Corporation since the year 1885. It formerly belonged to the old Lincoln Gas Light and Coke Company, which was incorporated by an Act passed in the month of May, 1828, and was acquired by the Lincoln Corporation under the Gas Purchase Act of 1885. In the Act of 1828, the limits of supply were the then City of Lincoln and what was known as the Bail, or Close, of Lincoln. The next Act of importance affecting the old Company was the Act of 1873. By this the limits of supply were extended to the parishes of Bracebridge, Boultham, and Canwick, in the county of the parts of Kesteven. Since then, in 1920, the boundaries of the city had been extended to include the old urban district of Bracebridge and the parish of Boultham, so that all that was left of the 1873 extension in the county of Kesteven was the old parish of Bracebridge Heath and the parish of Canwick.

The first gas-works of the old Company were erected in 1829 in Newland; and those works still existed to-day, in the heart of the city. The more up-to-date works, which governed the supply to a large extent at the present time, were erected at Bracebridge, in the South part of the city, in 1876. They were authorized by the Lincoln Gas Light and Coke Company's Act of 1873, and in the schedule of that Act there was the existing land upon which the Corporation were authorized to manufacture and store gas, and manufacture residual products. By the Gas Purchase Act of 1885, the limits of supply were extended to a further parish, the parish of Skellingthorpe, also in the county of the parts of Kesteven. By a more recent Act, the Lincoln Corporation Act of 1915, the limits of supply were extended to North Hykeham and Waddington, in the county of the parts of Kesteven. It would thus be seen that the Corporation had a large area of supply at the present time in the rural district of Branston, in Kesteven. They had no area of supply in the rural district of Welton (Lindsey).

The maximum price of gas was fixed under the 1873 Act at 4s. 6d. per 1000 c.ft. Under the Gas Purchase Act of 1885 the price was reduced to 4s., which maximum price still obtained. The Corporation had owned the gas undertaking for the past forty-three years, and during that time the Gas-Works Committee which controlled and managed the undertaking had been under the presidency of two Chairmen only, and for the past thirty years the Chairman had been Alderman T. Wallis. The Corporation were very proud of the record of the wise and careful way in which he had controlled the undertaking. It was due to his foresight and wisdom that the capital burden of the undertaking was to-day so exceedingly light; and the present consumers were reaping the benefit of his wise policy.

Mr. Need proceeded to refer briefly to the provisions under the Draft Order in respect of which that application was being made, and also gave the viewpoint of the Corporation with regard to the objections raised. The Corporation had served notices of the present application on the owners, lessees, and occupiers of every dwelling-house within a radius of 300 yards of the proposed site at the rear of the Bracebridge Gas-Works. He had received only one formal objection to the proposal from these people, and that was by Mr. Frederick Brown. Mr. Brown stated that he objected to the application on the grounds that it would deteriorate his property and be a personal nuisance to himself and household. Of course, no one liked the prospect of a gas-works being brought any nearer his house than at present, but the fact remained that the present works existed when Mr. Brown acquired his house; and he (the Town Clerk) submitted it was evident to anyone living on Cross o' Cliff Hill that, if at any future time the Corporation should require to extend their works, the only possible outlet was across the railway line on the east side, because the land on the north, south, and west sides was already developed.

Speaking of the other objections to the application, the Town Clerk said they referred to the proposed extension of the limits of supply. He thought the objections were identical. He had received them from the Branston and Welton Rural District Councils, from the Lindsey and Kesteven County Councils, and from the Washingborough Parish Council. He did not appreciate the grounds upon which the Washingborough Parish Council objected, but they stated that there was no demand for a supply of gas, and that in all probability similar powers might be sought for a supply of electricity. It did not follow that, because they included parishes in the area of their application, they were going to lay mains. They could not afford to do so unless they first knew there were sufficient consumers.

Coming to the objections of the Rural District Councils and the County Councils, the Town Clerk said they were three-fold. First of all they objected to the Corporation's proposal to take permissive powers to charge an extra 6d. per 1000 c.ft. for the proposed added limits. Secondly, they alleged that the protection afforded to County Councils and Rural District Councils was entirely inadequate; and also they objected to the Corporation having an indefinite monopoly with regard to the supply of gas.

In regard to the last objection, he had conceded a clause which would enable any local authority, company, or person to apply for power to supply gas in this area if the Corporation had not made use of their powers within ten years. With regard to the objection as to the permissive increase of 6d. per 1000 c.ft., the Corporation considered they were acting reasonably in asking for these powers, in case necessity should arise. They were not likely in their own interests to mulct the consumers in the added area of an extra charge unless there were abnormal circumstances. They might be asked to give a supply to outlying villages, some of which were three to six miles from the city; and this would mean a large expenditure on dead mains.

Under the Gas Purchase Act of 1885, the Corporation could contract to supply gas to specific premises outside their limits, and could fix special terms in these cases. They considered that the permissive increase of 6d. would not be objected to, as they were now supplying gas at the low price of 3s. 9d. per 1000 c.ft., and prior to the coal stoppage the price was only 3s. 3d.

Ever since 1847 a code for the protection of road authorities had been in existence, and those conditions had been in operation in Lincoln since before 1847, and had worked well in their area of supply during the last hundred years. The chief difficulty encountered was the question of removal and relaying of pipes in the event of widening roads or bridges. The Corporation were not out to evade obligations. They had always fulfilled them in regard to the relaying of mains. They were not entitled to interfere with the structure of any bridge, and could only lay mains in the sub-soil. This, surely, was sufficient precaution.

Mr. *Wm. Henry Mainwaring* (Gas Manager to the Lincoln Corporation since 1915) spoke of the system adopted with regard to laying and relaying of mains. The usual custom in cases where gas supply was laid on to villages near Lincoln, he said, was to ask the City Engineer and Surveyor to repair the roads. In the case of the main roads, the road had been opened by consent of the County Surveyor, who afterwards repaired the roads and charged Lincoln with the cost.

Mr. W. T. Phipps (Deputy Clerk, representing the Kesteven County Council) said the Kesteven County Council thought it was improper that the additional charge should be perpetual. They would like an alteration in the clause so that an undertaking might be given that the extra charge would not be levied unless heavy additional expenditure was encountered; and they also asked that the charge should in time disappear. With regard to roads, he said that, if they were widened, it would necessitate the removal of mains, the cost of which would fall upon the highway authority. This would also apply to the widening of bridges. They were entirely satisfied with road arrangements in Kesteven, but as yet they had never had to widen a bridge where there was a main.

Mr. *A. G. Bradshaw* (County Surveyor, Lindsey) said that, under the Order, five important main roads were affected. They ought to know all about the mains, and ought to have a dominating position.

Mr. *R. Epton* (Clerk to the Welton and Branston Councils) said his principal objection was to the permissive extra charge of 6d. He contended that it was a commercial undertaking by which Lincoln Corporation hoped to make a profit which would go to the relief of the city rates, while the added areas would derive no benefit. If the profit was to come to Lincoln, why should the added districts pay the extra rate? The Rural Councils could not agree to a profit being made at the expense of the added districts. The Councils objected to the increase except when justified by exceptional expenditure, and when the maximum charge had been exhausted in Lincoln. "Do not imagine," he concluded, "that we do not want the gas in the rural districts. We do, but we want it on the same terms as Lincoln consumers."

Mr. *Wm. Doig Gibb* (Consulting Engineer) drew attention to the fact that the Corporation would be put to greater expense in the new area than was involved in the present one. It was not right that people in the outside districts should get a cheap supply of gas at the expense of people in the central area. The maximum increase was 6d, but the actual increase might be fixed at a lower figure. When a district became a source of revenue, the price would be cut down.

The Town Clerk announced that he had just been authorized by the Chairman of the Gas-Works Committee to submit an offer that provision should be made in the clause that, at the expiration of ten years from the date of the Order, any of the local authorities concerned could apply to the Board of Trade for the revision of the 6d.

By consent the clause was amended to read: "At any time after the expiration of ten years."

Mr. *Epton* asked how much Lincoln Corporation had paid to rates from the gas undertaking during the last twenty years.

Mr. *J. H. Burgess* (City Treasurer) said the policy of the Corporation in running the gas undertaking was not to extract profit from outside consumers, but to supply gas to everyone at the cheapest possible rate. Only on two occasions in the last ten years had there been any profit applied to the rates; two small sums being taken under great pressure of unemployment. In 1922, 1925, and 1927 there were deficiencies; that in 1927 being £10,000.

The Court of Inquiry then adjourned to view the site of the gas-works.

NOTTINGHAM AND GASWORKERS' PENSIONS.

The Nottingham Gas Committee have embarked on a pensions scheme upon a contributory basis. In connection with it, an interesting gathering took place at the Drill Hall, Nottingham, on May 18, when Alderman Sir Albert Ball, Chairman of the Committee, who has occupied that position for 21 years, entertained the employees of the Department at dinner, the company numbering 830.

The gathering—at which interesting presentations, in token of personal regard, were made by the employees both to the Chairman of the Committee and to Mr. John Wilkinson, the Engineer and Manager—was typical of the cordial relationship existing between the Corporation and their employees. A solid silver fruit epergne, mounted on an ebony stand, and two silver flower vases were presented by the staff to Sir Albert Ball. To Mr. Wilkinson a smoker's cabinet, with pipes and silver cigarette case, was presented. The occasion was further marked by the gift of eight-day time-pieces to Messrs. A. Downs, H. Thorneloe, W. Lane, and W. Downs, and of an attaché case to Mr. F. Fishwick, in recognition of their share in formulating the scheme.

Mr. John Wilkinson, in acknowledging the presentation, expressed his appreciation of the spirit which had prompted those associated with him in the gas undertaking to make the gift. He proposed "Success to the Pension Scheme," observing that it denoted that workmen were prepared to practise as well as to preach the doctrine of self-help and of sacrifice for others. This was the first step towards the realization of an object which had for many years been dear to Sir Albert Ball's heart. The scheme which had been set on foot in relation to gasworkers was, he suggested, one which might be reasonably followed in relation to other departments of municipal work, and eventually be fathered by the Corporation itself.

Mr. A. Hayday, M.P., observed that for many years the old Gasworkers' Union in Nottingham petitioned the Gas Committee and the Corporation in favour of the establishment of a pensions scheme. The Committee made grants and gratuities, but these could be stopped at any time. Five years ago the Union called the men together, and suggested the adoption of a voluntary scheme. The position was misunderstood, but Sir Albert Ball always stood by them. Such an occasion as the present would lead to a better understanding between the industry and its employees. Trade Union combination properly regulated and sanely presented was the only way out of suspicion and mistrust. Ninety-five per cent. of the Nottingham Corporation's gas employees, clerical and manual, had joined the fund, the income of which was £20 a week. No disbursements would take place until after the expiration of six months. In his twenty years experience as chief district official in Nottingham, he had always found Sir Albert Ball prepared to listen fairly to any arguments put forward which had for their object the betterment of the men's conditions.

Sir Albert Ball, who met with a hearty reception, justified his claim to address the guests as "fellow workers" by recalling the circumstance that nearly a half-century previously he assisted in fixing gas columns in the streets of Nottingham. He was proud to be the Chairman of the Committee, a position which he had occupied for 21 years, and to know that it had as its employees such a fine body of men, who had launched a pension scheme that might be the beginning of something better.

The Tamworth Town Council have accepted the tender of the Tamworth Gaslight and Coke Company for street lighting.

IRISH GAS REGULATION.

The Industry and the New Free State Bill.

Before the passing of the Committee stage of the Irish Free State Gas Regulation Bill in the Dail (or Commons), it was agreed by amendment that meters must be stamped within a period of two years, and that there must be a reverification of meters during a period of five years or longer.

An important statement on behalf of the gas industry of the Free State has been circulated among the members of the House. It sets out that the gas industry supports the two main principles embodied in the Bill, but is of the opinion that the machinery which the Bill provides for putting these principles into practice needs adjustment if gas undertakings and consumers of gas alike are not to experience considerable difficulty and inconvenience, and very great expense.

The main proposals are as follows:

1. That within the maximum period of twelve months from the passing of the Act all gas meters shall be re-tested and re-stamped; and
2. that gas undertakings at present selling gas per 1000 c.ft. shall, in those cases where the Minister considers it desirable, be obliged to charge for thermal units supplied, at a price he considers reasonable.

The statement suggests amendments which are needed if the provisions of the Bill are to be carried out without causing unnecessary cost and inconvenience. In the case of unstamped meters, it is suggested that, if the period were extended to two years, an undertaking could be given that by that time every unstamped meter should bear the Free State stamp. This, as noted above, has been accepted.

As to meters at present bearing the Board of Trade stamp, the Minister informed a deputation recently that a period of five years would be allowed for reverification and restamping. The industry suggests this period should be extended to ten years. As to a statement made on the second reading of the Bill, that no meter should remain installed for more than ten years, it is pointed out that experience has shown that in Europe and America meters have been working from forty to sixty years, and were found to register correctly.

Though the Bill makes provision for the establishment of additional meter testing stations, it is almost certain that the two existing testing stations in Dublin and Cork will continue to be the only two stations available.

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

The market has been quiet and irregular. There has been very little demand for prompt coals, most orders to cover the holiday season having been previously covered. Consequently, there has been surplus coal with fewer ready buyers. Prospects ahead are still regarded hopefully, and some of the better-class collieries have sold enough over the rest of the year at current prices, and are confidently anticipating a gradual improvement in demand for export.

Prices are nominally unchanged. Wear Special and best quality gas makes are quiet at 15s. 6d. to 16s. and 15s. f.o.b. respectively. Seconds have been fairly well taken, and are quoted at 13s. 6d. to 13s. 9d., with some ordinaries obtainable down to 13s. Durham coking has been in better request at 13s. 6d. to 13s. 9d. Best bunkers are well booked, and firmly held at 14s. 6d. to 14s. 9d. Gas coke is firm at 20s. f.o.b. for prompt, with 21s. asked for forward positions.

YORKSHIRE AND LANCASHIRE.

Gas coals are moving slowly. Many contracts appear to have been booked ahead at slightly increased figures as compared with last year.

Industrial fuels have not maintained their position, figures being slightly easier than they were a few weeks ago. The export trade is rather better on account of the increased subsidy.

Domestic coal has been in less demand during the past week, with normal prices ruling.

The following are the Humber bunker and export prices, f.o.b. usual shipping ports: South Yorkshire—Hards, Association, bunkers 16s. 6d. to 16s. 9d., export 14s. to 14s. 6d.; washed trebles, export 15s.; washed doubles, bunkers 16s. 6d., export 14s. to 14s. 3d.; washed singles, export 13s. 6d. to 14s.; washed smalls, bunkers 12s. 3d., export 9s. 6d. to 10s.; smithy peas, export 16s. 6d. to 18s.

West Yorkshire—Hartley's (f.o.b. Goole), export 14s.; washed trebles, 14s. 6d. to 15s.; washed doubles, 13s. 6d. to 13s. 9d.; washed singles, 13s. 6d. to 13s. 9d.; washed smalls, 9s. 6d. to 10s.; unwashed doubles, 10s. 6d. to 11s. 6d.; rough slack, 9s. 6d.; coking smalls, 8s. 6d.

Derbyshire and Nottinghamshire—Top hards, bunkers 16s. 6d. to 16s. 9d., export 14s. 9d. to 15s. 3d.; washed smalls, bunkers 12s. 6d., export 10s.; unwashed doubles, export 11s. 6d.; rough slack, bunkers 12s., export 9s. 6d.

Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, bunkers 14s. 6d. to 16s., export 12s. to 14s.; gas coke, export 20s. to 22s. 6d.; furnace coke, export 17s. 6d. to 18s.; washed steam, bunkers 15s. 3d., all per ton.

MIDLANDS.

The market remains inert. Collieries hardly know what to do about summer prices. Whatever they do, there seems little prospect of stimulating demand into any activity yet awhile. As to the advances which were announced at the beginning of May by collieries inside the Five Counties Scheme, they have become a dead-letter, or very nearly so. With a market under no sort of difficulty in supplying its needs, higher prices were unenforceable.

A good many of the associated collieries raised their quota for the month before the Whitsun holidays, and closed down. Some of them found outlets for their production; contracts absorbing the greater part of the tonnage. There were other cases in which persistence in the attempt to increase prices so checked new business that doubts were expressed as to whether they could dispose of their quota. In this part of the area independent collieries have taken probably the larger proportion of the current business.

There is a sufficiency of rough slack at 7s. to 8s. 6d., pithead, and no lack of finer grades at lower rates. Beans fetch 8s. to 9s., nuts 9s. to 14s., steams 8s. 6d. to 15s. House coals maintain about the same range as previously.

NEW SHOWROOMS OPENED AT NEATH.

The history of the Neath Corporation gas undertaking has of late years been one of consistent progress. Recently another milestone in its development was marked by the opening of a new showroom in Neath Road, Briton Ferry. The ceremony was performed by Alderman M. G. Roberts, J.P., Chairman of the Gas Committee, who was supported by the Mayor and Mayoress of Neath, Councillor and Mrs. W. K. Owen.

After Alderman Roberts had opened the showroom, Mrs. Jackson, on behalf of the apparatus contractors, presented him with a silver key as a memento of the occasion.

Alderman Roberts, in expressing his thanks for the token, paid many tributes to the enterprise of the Engineer and Manager, Mr. W. Clarke Jackson, who, he said, was always far-sighted and sound in all his schemes for the welfare of the gas-using public in the Borough of Neath.

Subsequent speakers were the Mayor, Councillor W. K. Owen (the Deputy Mayor), and Councillors J. B. Williams, Richard Jenkins, and J. R. Jones.

Mr. J. Sadler, of Radiation, Ltd., expressed the pleasure it gave him to be present at the opening of the showroom. It would, he said, be a good thing both for the manufacturers and for the gas undertaking.

In conjunction with the inauguration of the new showroom, an exhibition was held at the Minor Hall, Briton Ferry, which was opened by the Mayor, who was presented by the appliance manufacturers with a silver cigarette case and match box. The Mayor, in his address, remarked upon the recent development of the gas undertaking in Neath. The large and commodious hall was tastefully decorated; and all the latest in gas apparatus was arranged for inspection.

The showroom, which commands an excellent situation in the main road of Briton Ferry, is attractively decorated and furnished, and is later to be fitted out with a model kitchen, living-room, bathroom, &c. The people of the district are already making every possible use of the facilities afforded.

CONTRACTS OPEN.

Coal.

The Sedgley Urban District Council invite tenders for the supply of gas coal. [See advert. on p. 618.]

The Hebden Bridge and Mytholmroyd Gas Board invite tenders for the supply of gas nuts. [See advert. on p. 619.]

Oxide (New and Spent).

The Rochdale Gas Department invite tenders for the supply of new oxide of iron and the purchase of spent oxide. [See advert. on p. 618.]

Tar and Ammoniacal Liquor.

The Gas Committee of the Penrith Urban District Council invite tenders for the purchase of surplus tar. [See advert. on p. 618.]

The Gas Committee of the Loughborough Corporation invite tenders for the purchase of tar and ammoniacal liquor. [See advert. on p. 619.]

Vitriol.

The Rochdale Gas Department invite tenders for the supply of B.O. vitriol. [See advert. on p. 618.]

Wrexham Gas Order.—The objections of the Wrexham Corporation to the Wrexham Gas Special Order have now been withdrawn. The standard price of gas has been fixed at 9·8d. per therm, with a neutral zone to 10·4d. per therm. The existing price for gas to ordinary consumers in the Wrexham area is 11d. per therm. The amended Order also provides for the revision of the standard price on application by either the Corporation or the Company.

Growth of Gas at Bideford.—A record sale of gas was reported at the annual meeting of the Bideford Gas and Coke Company, Ltd., when final dividends were declared at the rate of 8 p.ct. on the original shares and 6½ p.ct. on the additional shares, making 14½ p.ct. and 11½ p.ct. respectively for the whole year. The sum of £2444 was carried forward to the next account. The Chairman, Mr. Montague J. Durant, moving the adoption of the report, said that the sale of gas had increased 6·4 p.ct. over that of the previous year. The Directors were pleased to announce a reduction of ¾d. per therm, to take effect from the reading of the meters at the Lady Day quarter, making the present price 8·6d. per therm. During the year the Company fixed 220 cookers, 133 heating stoves, and 119 water heaters.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *May* 26.

Tar products have been very quiet during the past week, and little business is reported. Values generally remain unchanged as follows:

Pitch, 65s. per ton.

Creosote, 8¼d. to 8½d. per gallon.

Pure benzole, 1s. 8d. to 1s. 9d. per gallon; pure toluole, about 2s. 2d. to 2s. 3d. per gallon; 95/160 solvent naphtha, about 1s. 7d. per gallon.

Pyridine, 5s. 3d. to 5s. 6d. per gallon.

Tar Products in the Provinces.

May 26.

The average prices of gas-works products during the week were: Gas-works tar, 43s. 3d. to 48s. 3d. Pitch—East Coast, 62s. 6d. to 65s. f.o.b. West Coast—Manchester, 55s. to 57s. 6d.; Liverpool, 57s. 6d. to 60s.; Clyde, 60s. to 62s. 6d. Toluole, naked, North, 1s. 5d. to 1s. 6d. nominal. Coal-tar crude naphtha, in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 1½d. to 1s. 2d. Heavy naphtha, North, 1s. to 1s. 0½d. Creosote, in bulk, North, liquid, 6¾d. to 6¾d.; salty, 6½d. to 6¾d.; Scotland, 6¼d. to 6½d. Heavy oils, in bulk, North, 8¼d. to 8¼d. Carbolic acid, 60 p.c.t. 2s. 3d. to 2s. 4d. prompt. Naphthalene, £13 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.c.t., purely nominal; "B" quality, unsaleable.

Benzole Prices.

The following are considered to be the market prices to-day:

	s. d.	s. d.	
Crude benzole	0 10½	to 0 11	per gallon at works
Motor ,,	1 4½	,, 1 5	,, ,, ,,
90 p.c. ,,	1 5½	,, 1 6	,, ,, ,,
Pure ,,	1 9	,, 1 10	,, ,, ,,

Sulphate of Ammonia for Home Agricultural Use in June.

Nitram Limited, Victoria Station House, S.W.1, announce that they have decided to continue selling neutral sulphate of ammonia, basis 20·6 p.c.t. nitrogen, for home agricultural use during the month of June at the current price of £10 13s. per ton delivered carriage paid in 6-ton lots and upwards to buyer's nearest station, or *ex* works in 1-ton lots and upwards; all other terms and conditions as per their circulars 2/28 N and 2A/28 N.

TRADE NOTES.

Blackman Volume Fans.

An interesting booklet of 38 pages has been published by James Keith & Blackman Company, Ltd., of 27, Farringdon Avenue, E.C. 4. The "Blackman" fan combines efficiency with strength of construction.

Milne's Meters, Ltd.

Milne's Meters, Ltd., of Edinburgh and Leeds, have established a London office at 25, Grosvenor Place, S.W. 1; the Bland Light Syndicate, Ltd., having been appointed their agents for the South. Mr. F. J. Gould, the Managing Director, was associated with Messrs. James Milne & Son, Ltd., for many years.

Aluminium Powder.

The British Aluminium Company, Ltd., of Adelaide House, King William Street, E.C. 4, have issued a booklet explaining the advantages of the use of aluminium paint as a decorative medium, a protective coating, a light reflector, a heat reflector and conservor, a waterproofing medium, and a primer.

Results at Huddersfield.—Huddersfield Corporation Gas Department report a surplus of £24,129 for the past financial year (after allowing £36,936 for interest and sinking fund), as compared with £5429 the previous year.

Whessoe Foundry and Engineering Company, Ltd.—In the eighth annual report, which will be submitted to the shareholders at the meeting to-morrow (Thursday), the Directors state that the profit for the year to March 31 last, including interest and transfer fees, amounted to £29,906. From this is deducted depreciation on land, buildings, fixed plant, and machinery, £4034; amount applied to write-down investments, £5000; and provision for staff welfare scheme, £500. This leaves a net profit for the year of £20,371. Adding the amount brought forward from the previous year, after payment of dividend, there is a sum available for distribution of £25,220. Out of this sum the Directors recommend the payment of a dividend of 12½ p.c.t. (less income-tax), which will leave to be carried forward (subject to Directors' commission on profits), £5220. During the year under review, the Company were fortunate in obtaining a substantially larger volume of work, which has resulted in the increased trading profits shown by the accounts. The Company has secured, in conjunction with a Scottish company, the manufacturing rights for certain countries of the "Wiggins Floating Roof" for tanks. This form of roof has important merits which are becoming widely appreciated; and a number of orders have already been secured. Mr. H. S. Smith-Rewse, who has represented the Company in London for the past forty years, retired from this position at the end of 1927. Mr. C. M. Spielman, M.C., Assoc.M.Inst.C.E., has been appointed to take his place.

Results at Salford.

At a recent meeting of the Salford Gas Committee—Alderman F. S. Phillips presiding—the trading figures for the year ended March 31 were presented, and were stated to show a gross profit of £167,778. The charges against this amounted to about £95,000, representing interest and redemption of loans, renewals, main services, and other items. In addition, there was a payment to the city fund of £12,000; and the Committee have paid off an amount of nearly £54,000 borrowed in 1926 to meet the extra cost of coal due to the prolonged dispute in the mining industry in that year. After allowing for all these deductions, there is a net profit for the year of about £5000, which it is proposed to place to the reserve fund. Towards the close of 1926 there were two increases of 6d. per 1000 c.ft., raising the price from 3s. 10d. to 4s. 10d. From September quarter last the price was reduced to 4s. 4d. per 1000 c.ft., and the Committee have now recommended the Council to approve a further reduction of 6d. as from the June quarter. It is understood that the Committee considered the question of a further reduction to large consumers, but, pending further information, a decision was deferred to a future meeting.

Gosport District Gas Company.—The tenders for the £25,000 6 p.ct. redeemable debenture stock which Messrs. A. & W. Richards offered for this Company were opened on May 22, the issue being more than twice subscribed at prices ranging from £103 per £100 down to the minimum of par.

Fire at Falk, Stadelmann, & Co., Ltd.—On Wednesday morning last a fire broke out at the premises of Messrs. Falk, Stadelmann & Co., Ltd., in Farringdon Road, E.C.4. The fire was confined to the packing floor, and was quickly brought under control. It will in no way affect the normal business of the firm.

Seaford Gas Company's Reduction.—The Seaford Gas Company, Ltd., intimate that the price of gas to ordinary consumers will be reduced, as from the Midsummer readings, to 1s. 1d. per therm (equivalent to 5s. 5d. per 1000 c.ft.), a reduction of 0·8d. per therm (equivalent to 4d. per 1000 c.ft.). This reduction also applies to power users.

Found at Rochester.—A pair of gold-rimmed spectacles in a case were found on one of the tables when lunch was concluded at the Town Hall, Chatham, on the occasion of the visit of the Southern Association of Gas Engineers and Managers on May 18. The owner can obtain possession of these upon writing to Mr. C. Valon Bennett, Engineer, General Manager, and Secretary of the Rochester, Chatham, and Gillingham Gas Company.

Growing Demand at Chorley.—Extensions to the gas-works approved by the Chorley Town Council, at a cost of over £60,000, are due to the continually increasing demand. The gas made for the year ended March 31 last was over 255 million c.ft., against 247 millions for the previous year. Consideration is now being given to an application from the township of Charnock Richard, and it is probable other villages will soon be seeking supplies.

Keighley Superannuation Scheme.—The Keighley Gas and Electricity Departments are to be called upon to bear jointly the sum of £2477 towards a total of £6792 to be charged against public funds under a newly-adopted scheme of superannuation for municipal officials, which comes into operation on July 1 next. The scheme is under the Local Government Officers' Superannuation Act, 1922, and officials will retire compulsorily at 65 years of age unless the Town Council decides in any particular case to retain his services up to the age of 70.

Preference Issue for Walton-on-Thames.—By order of the Directors, Messrs. A. & W. Richards are offering for sale by tender £12,000 of 6 p.ct. irredeemable preference stock in the Walton-on-Thames and Weybridge Gas Company. The minimum price at which stock will be allotted is £103 p.ct. Tenders must be sent to the firm at 37, Walbrook, E.C., by Thursday morning, June 7. Considerable development is taking place in the Company's district; and the output of gas is steadily increasing. The number of consumers on the Company's books at Dec. 31 last was 5510.

Bingley Gas Progress.—The Bingley Urban District Council, on May 22, approved a reduction in the price of gas, from 3s. 6d. to 3s. 4d. per 1000 c.ft., as from July 1 next. The net profit on the Department for the year ended March 31 was £2980, and the reserve fund up-to-date is £12,210. In 1926-27 there was a net loss. The Department have 3950 ordinary and 2358 slot consumers—a total of 6308, as against 6025 in the previous year—and this, as the Chairman (Mr. T. Snowdon) remarked, despite all that is said in favour of electricity. Bingley have 2423 cookers and 60 fires out on simple hire.

Spark Ignites a Gas Pocket.—Eight workmen were injured by burns, by an unusual mishap, at the Huddersfield Corporation Gas-Works on May 21. They were engaged in emptying oxide of iron from the purifying boxes. The lid of one of the boxes had been removed, and work was commenced with pick and shovel when one of the men, so it is believed, caused a spark in striking an iron stanchion, and a pocket of gas became suddenly ignited, and a flame shot up for the whole length of the bay in which the eight men were working. The flame quickly burned itself out, but not before the men had received considerable burns. There was no damage to the purifying box. Five of the men were detained at the hospital, and three were allowed to go home after treatment.

There was a large attendance of the general public last week at an exhibition at the Torquay Town Hall promoted by the Torquay and Paignton Gas Company. The Company exhibited a large assortment of fittings, and demonstrated the new apparatus by means of which ice is made by gas. Cookery demonstrations were given twice daily by Miss M. Longworth; and there were competitions in fancy confectionery for the school children from the cookery centres in Torquay.

STOCK MARKET REPORT.

THE general depression continued when business opened on the Stock Exchange last week. Towards the close of the week the position improved somewhat, and prices compared fairly well with those ruling at the end of the previous week; but considerable anxiety existed, and a number of leading brokers advised their clients to reduce their commitments. Speculative securities were most affected, particularly Gramophone and Artificial Silk shares.

Investment stocks maintained a calm front, and there was little or no change on balance. The new London County Council Loan was largely over-subscribed, and dealings touched 10s. premium. Foreign bonds were also satisfactory; but Home Rails, on another batch of poor traffic returns, remained dull and uninteresting.

Business in the Gas Market was quite normal. It will be noticed from the Table that the only quotations marked down were those of Companies operating abroad. Imperial Continental ordinary, which has advanced materially in value during the past month or so, fell 7 points to 167-172 *ex* div. Of the English Companies, Plymouth and Stonehouse 5 p.ct. jumped up 6 points to 108-113. At this price, however, it is still below its true value, and yields over 7 p.ct. Liverpool ordinary, which was marked up 4 points to 92½-93½, yields just under 6 p.ct.

The following transactions were recorded during the week: On Monday, Alliance and Dublin 94⅝, Bristol 5 p.ct. 86, British 4 p.ct. debenture 76, Continental Union 36, 7 p.ct. preference 93, Croydon maximum dividend 86½, Gas Light and Coke 19s., 19s. 0¾d., 19s. 1¾d., 19s. 3d., 3½ p.ct. maximum 64⅞, 4 p.ct. preference 79½, 3 p.ct. debenture 61⅞, 6 p.ct. Brentford debenture 104, Imperial Continental 176, 177, 177½, 178, Newcastle 3½ p.ct. debenture 67⅛, Primitiva 25s. 6d., 25s. 9d., 25s. 10½d., 26s., 26s. 1¼d., 26s. 3d., South Metropolitan 106, 106¼, 106⅜, South Suburban 106⅛. Supplementary prices, Brighton 4 p.ct. debenture 75, Uxbridge 5 p.ct. debenture 98⅜.

On Tuesday, Aldershot "C" 76½, Commercial 3 p.ct. debenture 60, Gas Light and Coke 18s. 9¾d., 18s. 10¼d., 18s. 11¼d., 19s., 19s. 1¼d., 19s. 3d., 4 p.ct. preference 79½, 80, 6 p.ct. Brentford debenture 102, 103½, Imperial Continental 175, 176, 177½, North Middlesex 6 p.ct. 98½, Primitiva 25s. 9d., 25s. 10¼d., 26s., 26s. 1¼d., 26s. 3d., South Metropolitan 105⅝, 106, 106¼, 106½, 106⅝, 6 p.ct. preference 112, South Suburban 5 p.ct. debenture 96, 97, 98, Tottenham 4 p.ct. debenture 76½. Supplementary prices, Grays and Tilbury New 5 p.ct. debenture 98½, Liverpool 5 p.ct. 93½, Southend and District 5 p.ct. debenture 94⅛, Uxbridge 5 p.ct. debenture 98⅜.

On Wednesday, Bombay 22s. 3d., Cape Town 4½ p.ct. debenture 76, Commercial 99½, 99¾, Continental Union 35, Gas Light and Coke 18s. 8½d., 18s. 9d., 18s. 9⅜d., 18s. 10¼d., 19s., 4 p.ct. preference 79½, 80, 3 p.ct. debenture 62, Imperial Continental 171, 176, Primitiva 25s. 7½d., 25s. 9d., 25s. 10½d., 26s., 26s. 3d. Supplementary prices, Croydon 4 p.ct. debenture 80, Felixstowe "A" 131, Grays and Tilbury New 5 p.ct. debenture 98½, 98⅜, Liverpool 5 p.ct. 90½, 91½, Metropolitan (of Melbourne) 10, Tottenham 5 p.ct. (iss. at 96½, partly paid) 2, 2¼, 2⅜, 2⅜ p.m., Wandsworth 5 p.ct. debenture 100½, 100⅜, 100⅜.

On Thursday, Bombay 21s. 6d., Gas Light and Coke 18s. 7½d., 18s. 9d., 18s. 10¼d., 18s. 11¼d., 19s., Imperial Continental 169½, 170, 171, 172, *ex* div., Primitiva 25s. 9d., 25s. 10½d., 26s., South Metropolitan 6⅛ p.ct. debenture 101½. Supplementary prices, Grays and Tilbury New 5 p.ct. debenture 98⅜, Tottenham 5 p.ct. 99, 99½, 99½ (iss. at 96½, partly paid) 2½, 2⅝, 2⅝ p.m.

On Friday, Aldershot 76½, 77, British 7 p.ct. preference 115, Continental Union 7 p.ct. preference 93, Croydon sliding-scale 110, 110½, maximum dividend 85, Gas Light and Coke 18s. 7½d., 18s. 9d., 18s. 10½d., 19s., 3 p.ct. debenture 61½, 62, Imperial Continental 167, 168, 169, 170, 172, Montevideo 92, Primitiva 25s. 9d., 25s. 10½d., 26s., South Metropolitan 106, 6½ p.ct. debenture 101½, South Suburban 5 p.ct. debenture 96½, Tottenham "B" 95½, Wandsworth 4 p.ct. debenture 77⅜. Supplementary prices, Hartlepool 5 p.ct. debenture 98⅜, Southend-on-Sea 4 p.ct. debenture 74⅜, 75⅜, Tottenham 5 p.ct. mort. (iss. at 96½, partly paid) 2, 2¼, 2⅜, 3, Wandsworth 5 p.ct. debenture 100⅜.

During the past two weeks the monetary situation has been easing gradually, with the result that there were abundant credits at the close of last week. After lenders had endeavoured to obtain 3½ p.ct., the rate gradually fell until offers at 2½ p.ct. were not accepted. The discount market was quiet in the expectation of a lower rate for Treasury Bills. These averaged £3 18s. 9·72d. p.ct., or over 1s. 5d. p.ct. below the previous week's rate.

The Foreign Exchange Market was quiet, and there were very few changes in the rates. Sterling on New York was quite firm, and closed slightly higher at 4.88 5/16. The French currency remained unchanged at 124; Spanish pesetas closed 1c. higher at 29.18; Italian lire reacted from an early advance; and the Dutch rate declined to 12.09⅜.

Silver was offered on Chinese account, and the price fell to 28 7/16d. per oz.; and the small amount of Gold available was sold at 84s. 11d. per oz.

The Bank Rate is 4½ p.ct., to which it was reduced from 5 p.ct. on April 21, 1927. The Banks' deposit rate is 2½ p.ct., and the deposit rates of the discount houses are 2¼ p.ct. at call and 2⅜ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. May 25.	Rise or Fall on Week.	Transaction Lowest and Highest Prices.
£			%p.a	% p.a.				
171,978	Stk.	Feb. 9	5	5	Aldershot 5 p.c. max. C.	72—77	..	76½—77
413,992	,,		4	4	Do. 4 p.c. Pref.	69—72	..	..
1,551,868	,,	Apl. 12	7	7	Alliance & Dublin Ord.	93—96	..	94⅝
274,000	,,	Jan. 12	4	4	Do. 4 p.c. Deb.	64—67	..	..
222,654	,,	Mar. 8	7	7	Barnet Ord. 7 p.c.	109—112	..	..
200,000	£1	Apl. 26	1/7½	1/7½	Bombay, Ltd.	21/—23/-	..	21/6—22/3
170,000	10	Mar. 8	8½	8½	Bournemouth 5 p.c.	12½—13½	..	..
600,050	10	,,	7	7	Do. B 7 p.c.	12—12½	..	..
575,000	10	,,	6	6	Do. Pref. 6 p.c.	10½—11	..	..
60,000	Stk.	Jan. 12	3	3	Do. 3 p.c. Deb.	56—59	..	..
163,025	,,	,,	4	4	Do. 4 p.c. Deb.	76—79	..	..
357,900	,,	Mar. 8	7½	7½	Brighton & Hove 6 p.c. Con.	116—119	..	..
341,880	,,		6/8/6⅔	6⅔	Do. 5 p.c. Con.	103—106	..	..
1,287,500	,,	Feb. 23	5	5	Bristol 5 p.c. max.	87½—88½*a*	..	86
885,000	,,	Mar. 22	8	7	British Ord.	113—116	..	..
100,000	,,	Dec. 22	7	7	Do. 7 p.c. Pref.	114—117	..	115
100,000	,,		4	4	Do. 4 p.c. Red. Deb.	73—76	..	76
130,000	,,	,,	—	33/2	Do. 5 p.c. Red. Deb.	95—98	..	..
200,000	,,	,,	8	6	Cape Town, Ltd.	7½—8½*	—½	..
100,000	10	May 24	4½	4½	Do. 4½ p.c. Pref.	6½—7½	..	..
100,000	10	Apl. 26	4½	4½	Do. 4½ p.c. Deb.	72—77	..	76
160,000	Stk.	Dec. 22	6	6	Cardiff Con. Ord.	98—101	..	..
496,860	,,	Feb. 23	7½	7½	Do. 7½ p.c. Red. Deb.	101—104	..	..
827,860	,,	Jan. 12	5	6½	Chester 5 p.c. Ord.	87—92*b*	..	..
197,150	,,	Feb. 23	†2/-	†2/-	Colombo Ltd. Ord.	31/—33/-	..	..
79,185	1	Apl. 26	1/4½	1/4½	Do. 7 p.c. Pref.	20/—22/-	..	..
94,495	1	Apl. 12	1/9½	1/9½	Colonial Gas Assn. Ld. Ord.	23/—25/-	..	..
275,402	1		1/7½	1/7½	Do. 8 p.c. Pref.	20/—22/-	..	..
187,848	1	,,	—	1/7½	Commercial Ord.	98—101	..	99½—99½
2,073,280	Stk.	Feb. 23	5	7	Do 8 p.c. Deb.	58—61	..	60
475,000	,,	Dec. 22	8	8	Continental Union, Ltd.	33—38	+1	35—36
800,000	,,	Sept. 29	‡1	‡1	Do. 7 p.c. Pref.	90—95	+2	93
200,000	,,	Mar. 8	7	7	Croydon sliding scale	108—113	..	110—110½
767,580	,,	Mar. 8	6½	7	Do. max. div.	84—87	..	85—86½
498,100	,,	,,	5	5	Derby Con.	110—115*e*	..	..
492,370	,,	Mar. 8	7	10	Do. Deb.	71—78*e*	..	..
85,000	,,	Dec. 22	4	4	Do. 6 p.c. Br'tf'd Rd. Db.	102—105	..	102—104
209,000	,,	Mar. 8	5	5	Do. 5 p.c. Red. Deb.	99—101	..	..
50,000	,,	Dec. 22	5	5	Eastbourne 5 p.c. Deb.	98—98	..	..
1,002,180	,,	Mar. 22	†4	†6	European, Ltd.	8—9	..	..
18,705,480	Stk.	Feb. 9	5	5/1/4	Gas Light & Coke 4 p.c. Ord.	18/6—19/-*f*	—/6	18/7½—19/3
2,800,000	,,	,,	3½	3½	Do. 3½ p.c. max.	63—65	..	64⅜
4,187,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	77—80	..	79½—80
5,628,630	,,	Dec. 22	3	3	Do. 3 p.c. Con. Deb.	60—62	..	61½—62
181,815	,,	,,	6	6	Do. 6 p.c. Br'tf'd Rd. Db.	102—105	..	102—104
1,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb.	99—101	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Mar. 8	6⅔	6⅔	Hastings & St L. 5 p.c. Conv	87—90	..	..
258,740	,,	,,	5⅔	5⅔	Do. 3½ p.c. Conv.	68—71	..	..
70,000	10	Apl. 26	†10	†10	Hongkong & China, Ltd.	13½—14½	..	..
173,200	Stk.	Mar. 8	5	5	Hornsey Con. 3½ p.c.	78—81	..	..
1,978,000	,,	May 24	10	10	Imperial Continental Cap.	167—172*	—7	167—178
223,130	,,	Feb. 9	8½	8½	Do. 3½ p.c. Red. Deb.	68—70	..	..
235,242	,,	Mar. 8	7	7	Lea Bridge 6 p.c. Ord.	94—97	..	..
2,145,907	,,	Feb. 23	5½	5½	Liverpool 5 p.c. Ord.	92½—93½*b*	+4	..
600,000	,,	Mar. 22	7	7	Do. 7 p.c. Red. Pref.	101½—103½*b*	..	..
165,786	,,	Feb. 23	9	8	Maidstone 5 p.c. Cap.	109—112	..	..
75,000	£5	Dec. 22	†7	†8	Malta & Mediterranean	5½—6	..	..
841,920	Stk.	May 24	†5	†7	Montevideo, Ltd.	91—93*	—2	92
2,061,315	,,	Mar. 8	5	5	Newcastle & Gateshead Con.	16/3—17/3*df*	..	..
860,929	,,	,,	4	4	Do. 4 p.c. Pref.	70½—71¼*d*	..	..
691,705	,,	June 29	8½	8½	Do. 8½ p.c. Deb.	66½—67½*d*	..	67½
131,780	,,	Mar. 8	6/18/0	6/18/0	North Middlesex 6 p.c. Con.	97—100	..	98½
800,000	,,	Apl. 26	9	7	Oriental, Ltd.	113—118	..	..
188,130	,,	Dec. 22	7⅜	7⅜	Plym'th & Ston'house 5 p.c.	108—113	+6	..
414,500	,,	Feb. 23	7½	7½	Portsm'th Con. Stk. 4 p.c. Std.	101—104	..	..
336,782	,,	,,	5	5	Do. 5 p.c. max.	77—80	..	..
2,334,464	£1	,,	—	—	Primitiva Ord.	25/6—26/6	..	25/6—26/3
244,500	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	92—95	..	..
695,000	Stk.	Jan. 26	4	4	Do. 4 p.c. Red. Deb. 1911	76—78	..	..
416,315	,,	Dec. 22	4	4	Do. 4 p.c. Cons. Deb.	75—77	..	..
150,000	10	Mar. 22	6	6	San Paulo 6 p.c. Pref.	8½—8⅝	..	..
125,000	50	Jan. 8	5	5	Do. 5 p.c. Red. Deb.	46—48	..	..
270,000	Stk.	Mar. 22	6	6	Sheffield A	100—102*e*	..	..
419,966	,,	,,	6	6	Do. B	100—102*e*	..	..
1,047,000	,,	,,	6	6	Do. C	100—102*e*	..	..
90,000	10	May 26	4	6	South African	4—6	..	..
6,609,895	Stk.	Feb. 23	5	7½	South Met. Ord.	105—107	..	105⅝—106½
500,000	,,	,,	—	6	Do. 6 p.c. Irred. Pf.	110—113	..	112
1,895,445	,,	Jan. 12	3	3	Do. 3 p.c. Deb.	59—62	..	..
734,600	,,	Mar. 8	6¼	6¼	Do. 6¼ p.c. Red. Db.	100—102	..	101½
91,500	,,	Feb. 23	8½	8½	South Shields Con.	111½—112½*d*	..	..
1,243,725	,,	Feb. 23	6½	6½	South Suburban Ord. 5 p.c.	105—108	..	106½
868,837	,,	Dec. 22	5	5	Do. 5 p.c. Deb.	95—98	..	96—98
647,740	,,	Mar. 22	5	5	South'mpton Ord. 6 p.c. max.	78—80	..	..
151,975	,,	Dec. 22	4	4	Do. 4 p.c. Deb.	73—76	..	..
350,000	,,	Mar. 8	7	7	Swansea 7 p.c. Red. Pref.	100—103	..	..
300,000	,,	Dec. 22	6½	6½	Do. 6½ p.c. Red. Deb.	99—102	..	..
150,000	,,	Feb. 23	7½	7½	Tottenham District A 5 p.c.	115—120	..	..
883,575	,,	,,	6½	6½	Do. B 3½ p.c.	93—96	..	95½
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	98—101	..	..
181,959	,,	Dec. 8	4	4	Do. 4 p.c. Deb.	76—79	+1	78½
289,094	,,	Mar. 8	5½	6⅜	Uxbridge, Maidenhead, & Wycombe 5 p.c.	90—95	..	..
88,580	,,	,,	5	5	Do. 5 p.c. pref.	86—90	..	..
80,000	,,	Mar. 8	3½	3½	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	129—134	..	..
255,236	,,	,,	7	7	Do. B 3½ p.c.	111—116	..	..
492,595	,,	,,	5/19/0	5/19/0	Do. C and New	98—103	..	..
352,030	,,	,,	6⅜	6⅜	Do. Wimbledon 5 p.c.	106—111	..	..
98,000	,,	,,	7½	7½	Do. Epsom 5 p.c.	112—117	..	..
200,000	,,	,,	5	5	Do. 5 p.c. Pref.	86—91	..	..
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